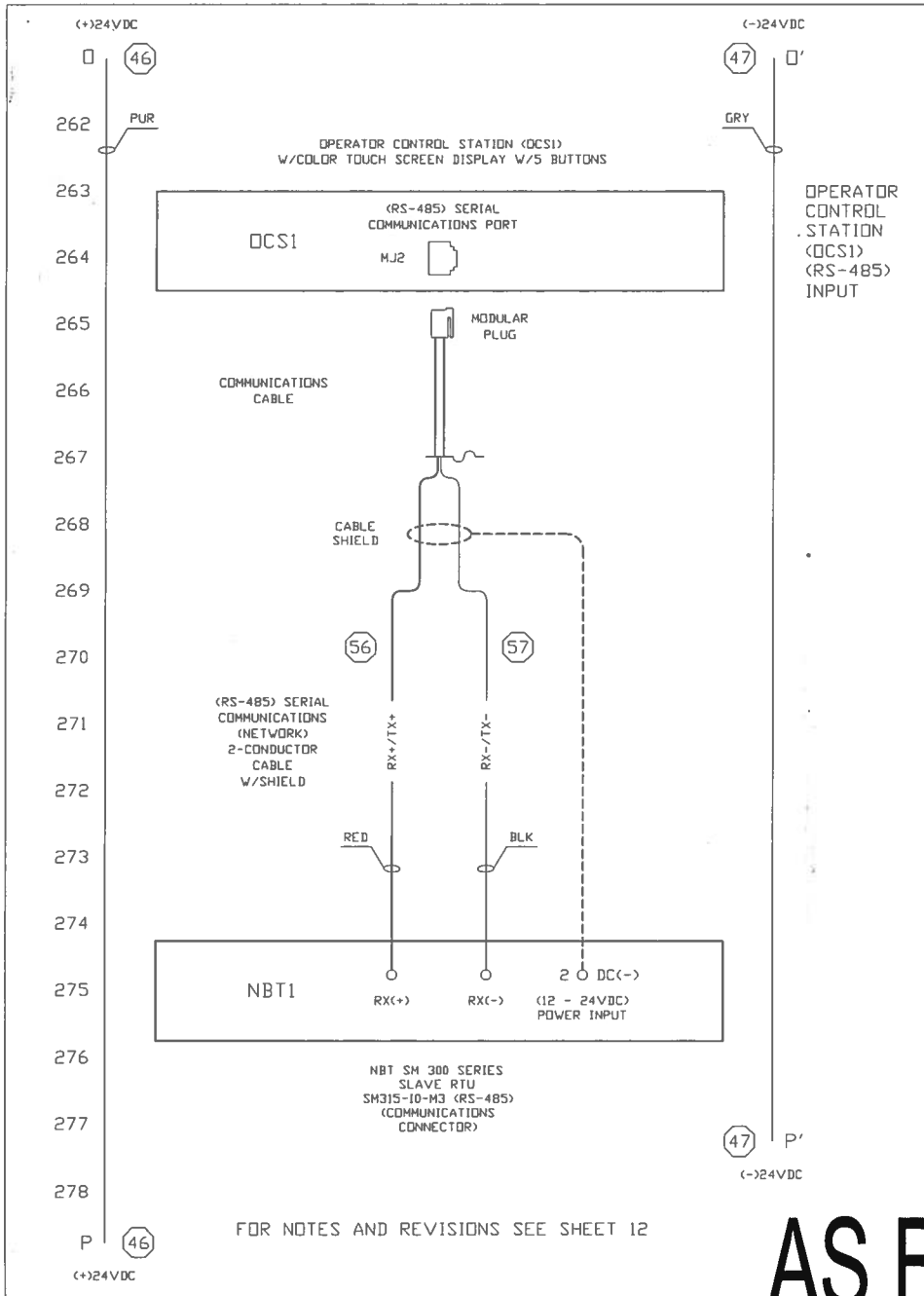


AS BUILT

JOB No. 16-12852A

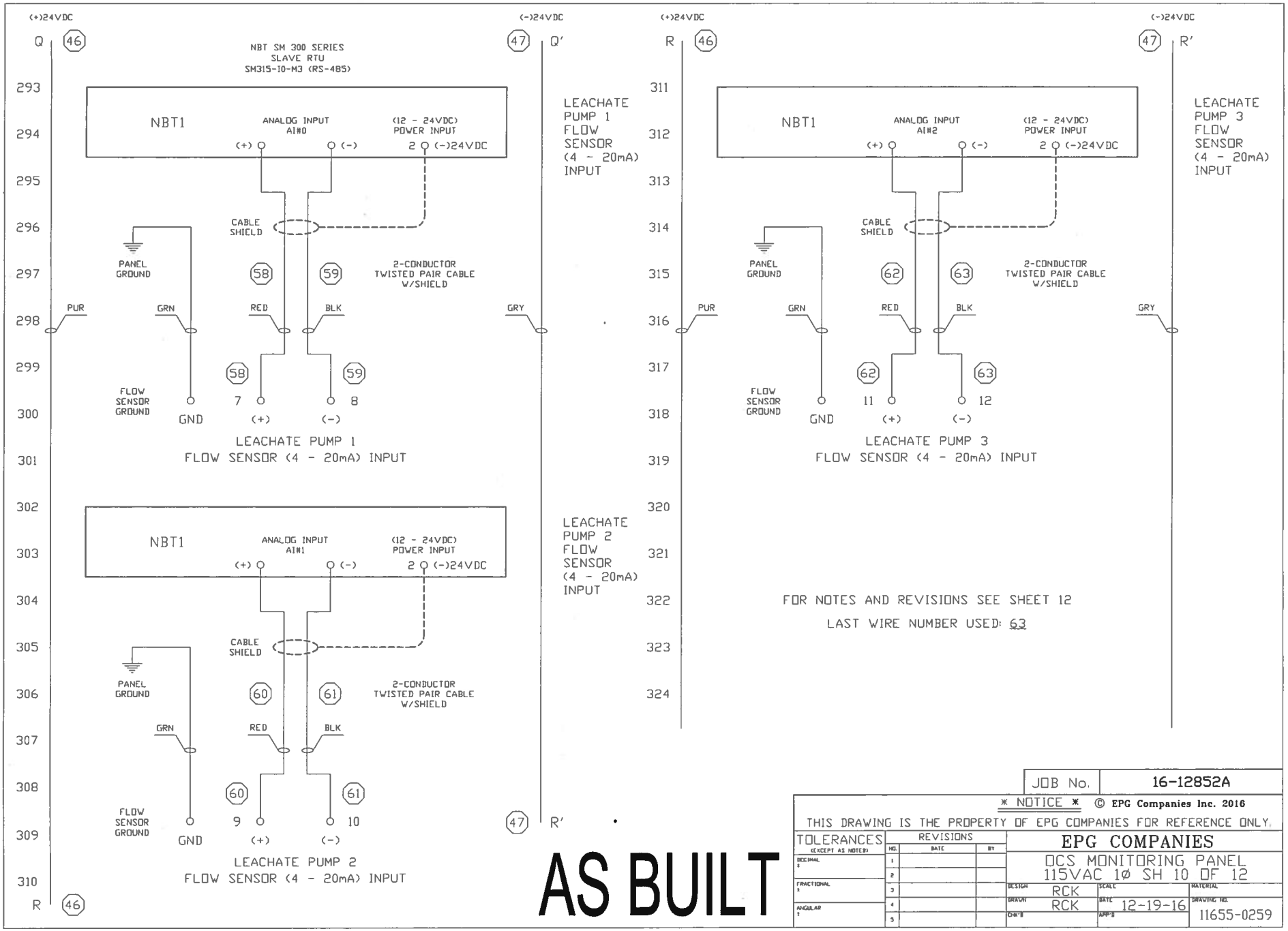
TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±

REVISIONS			
	NO.	DATE	BY
	1		
	2		
	3		
	4		
	5		

EPG COMPANIES

OCS MONITORING PANEL
115VAC 1Ø SH 9 OF 12

DESIGN	RCK	SCALE	MATERIAL
DRAWN	RCK	DATE 12-19-16	DRAWING NO. 11655-0258
CHK'D		APP'D	



FOR NOTES AND REVISIONS SEE SHEET 12

LAST WIRE NUMBER USED: 63

AS BUILT

JOB No. 16-12852A

* NOTICE *

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±

REVISIONS

NO.	DATE	BY
1		
2		
3		
4		
5		

EPG COMPANIES

DCS MONITORING PANEL
115VAC 1Ø SH 10 OF 12

DESIGN	RCK	SCALE	MATERIAL
DRAWN	RCK	DATE 12-19-16	DRAWING NO. 11655-0259
CHK'D		APP'D	

FIELD WIRING TERMINALS

LEVEL SENSOR (4 - 20mA) INPUT

L/N 236

1	– (+) RED	LEACHATE PUMP 1 LEVEL SENSOR (4 - 20mA) INPUT
2	– (-) BLACK	
GND	– SHIELD GROUND	

LEVEL SENSOR (4 - 20mA) INPUT

L/N 245

3	– (+) RED	LEACHATE PUMP 2 LEVEL SENSOR (4 - 20mA) INPUT
4	– (-) BLACK	
GND	– SHIELD GROUND	

LEVEL SENSOR (4 - 20mA) INPUT

L/N 254

5	– (+) RED	LEACHATE PUMP 3 LEVEL SENSOR (4 - 20mA) INPUT
6	– (-) BLACK	
GND	– SHIELD GROUND	

FIELD WIRING TERMINALS

FLOW SENSOR (4 - 20mA) INPUT

L/N 299

7	– (+)	LEACHATE PUMP 1 FLOW SENSOR (4 - 20mA) INPUT
8	– (-)	
GND	– SHIELD GROUND	

FLOW SENSOR (4 - 20mA) INPUT

L/N 308

9	– (+)	LEACHATE PUMP 2 FLOW SENSOR (4 - 20mA) INPUT
10	– (-)	
GND	– SHIELD GROUND	

FLOW SENSOR (4 - 20mA) INPUT

L/N 317

11	– (+)	LEACHATE PUMP 3 FLOW SENSOR (4 - 20mA) INPUT
12	– (-)	
GND	– SHIELD GROUND	

FOR NOTES AND REVISIONS SEE SHEET 12

AS BUILT

JOB No. 16-12852A

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±

REVISIONS

NO.	DATE	BY
1		
2		
3		
4		
5		

EPG COMPANIES

OCS MONITORING PANEL
115VAC 1Ø SH 11 OF 12

DESIGN	RCK	SCALE	MATERIAL
DRAWN	RCK	DATE 12-19-16	DRAWING NO. 11655-0260
CHK'D		APP'D	

FIELD WIRING TERMINALS

SUMP HIGH LEVEL ALARM (DRY OUTPUT CONTACTS)

L/N 49 — 13, 14, 15 — LEACHATE PUMP 1 SUMP HIGH LEVEL ALARM W/1-N/O & 1-N/C (DRY OUTPUT CONTACTS)

SUMP HIGH LEVEL ALARM (DRY OUTPUT CONTACTS)

L/N 67 — 16, 17, 18 — LEACHATE PUMP 2 SUMP HIGH LEVEL ALARM W/1-N/O & 1-N/C (DRY OUTPUT CONTACTS)

SUMP HIGH LEVEL ALARM (DRY OUTPUT CONTACTS)

L/N 81 — 19, 20, 21 — LEACHATE PUMP 3 SUMP HIGH LEVEL ALARM W/1-N/O & 1-N/C (DRY OUTPUT CONTACTS)

FAILURE (NO FLOW) ALARM (DRY OUTPUT CONTACTS)

L/N 99 — 22, 23, 24 — LEACHATE PUMP 1 FAILURE (NO FLOW) ALARM W/1-N/O & 1-N/C (DRY OUTPUT CONTACTS)

FAILURE (NO FLOW) ALARM (DRY OUTPUT CONTACTS)

L/N 113 — 25, 26, 27 — LEACHATE PUMP 2 FAILURE (NO FLOW) ALARM W/1-N/O & 1-N/C (DRY OUTPUT CONTACTS)

FAILURE (NO FLOW) ALARM (DRY OUTPUT CONTACTS)

L/N 131 — 28, 29, 30 — LEACHATE PUMP 3 FAILURE (NO FLOW) ALARM W/1-N/O & 1-N/C (DRY OUTPUT CONTACTS)

DOOR ALARM (DRY OUTPUT CONTACTS)

L/N 145 — 31, 32, 33 — DOOR ALARM W/1-N/O & 1-N/C (DRY OUTPUT CONTACTS)

FIELD WIRING TERMINALS

LEAK DETECT ALARM (DRY OUTPUT CONTACTS)

L/N 163 — 34, 35, 36 — LEAK DETECT ALARM W/1-N/O & 1-N/C (DRY OUTPUT CONTACTS)

PUMP RUN (DRY INPUT CONTACT)

L/N 200 — 37, 38 — LEACHATE PUMP 1 RUN N/O (DRY INPUT CONTACT)

PUMP RUN (DRY INPUT CONTACT)

L/N 205 — 39, 40 — LEACHATE PUMP 2 RUN N/O (DRY INPUT CONTACT)

PUMP RUN (DRY INPUT CONTACT)

L/N 210 — 41, 42 — LEACHATE PUMP 3 N/O (DRY INPUT CONTACT

DOOR ALARM (DRY INPUT CONTACT)

L/N 218 — 43, 44 — DOOR ALARM N/O (DRY INPUT CONTACT)

LEAK DETECT ALARM (DRY INPUT CONTACT)

L/N 223 — 45, 46 — LEAK DETECT ALARM N/O (DRY INPUT CONTCT)

NOTES:

1. NOT PART OF CONTROLLER

AS BUILT

JOB No.	16-12852A

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±

REVISIONS

NO.	DATE	BY
1		
2		
3		
4		
5		

EPG COMPANIES

OCS MONITORING PANEL
115VAC 1Ø SH 12 OF 12

DESIGN	RCK	SCALE	MATERIAL
DRAWN	RCK	DATE 12-19-16	DRAWING NO. 11655-0261
CHK'D		APP'D	

MOTOR	HP	VOLTAGE	FLA	FUSE SIZE
LEACHATE PUMP	1/2	230	5.0	8A

CAUTION: DO NOT CONNECT TO THE HIGH LEG OF AN "OPEN" DELTA POWER SUPPLY TO PREVENT PROBLEMS SUCH AS POOR PERFORMANCE, OVERLOAD TRIPPING OR ELECTRICAL EQUIPMENT FAILURE DUE TO CURRENT UNBALANCE

SOLUTIA
JUDITH LANE

NOTE: MAIN OVERCURRENT PROTECTION TO BE PROVIDED BY OTHERS

DANGER
HIGH VOLTAGE

#12AWG (BLK)
230VAC 1Ø
L1
L2
GND
GND

MAIN DISCONNECT
60 AMPS

CAUTION: DISCONNECT POWER BEFORE SERVICING THIS PANEL

#12AWG (BLK)
F1
F2
8 AMP

MC1
MC1
LEACHATE PUMP CONTROL

1/2HP @ 230VAC 1Ø
START WINDING CONTROL
START WINDING CONTROL
L1
L2
R
B
Y
G
GND

NOTE 1
R
B
Y
MTR1
LEACHATE PUMP MOTOR
GND

A
2
1
A'
230VAC 1Ø

FOR NOTES AND REVISIONS SEE SHEET 5

FIELD WIRING TERMINALS

LINE

L1
L2
230VAC 1Ø 60HZ
6.50 AMPS
GND
GROUND

LOAD (230VAC)

R
B
Y
GND
LEACHATE PUMP MOTOR

		RATING	
FUSE	TYPE	VOLTS	AMPS
F1-F2	FRN-R	250	8
F3-F4	FRN-R	250	1-1/4
F5	FNM	250	2-1/4

AS BUILT

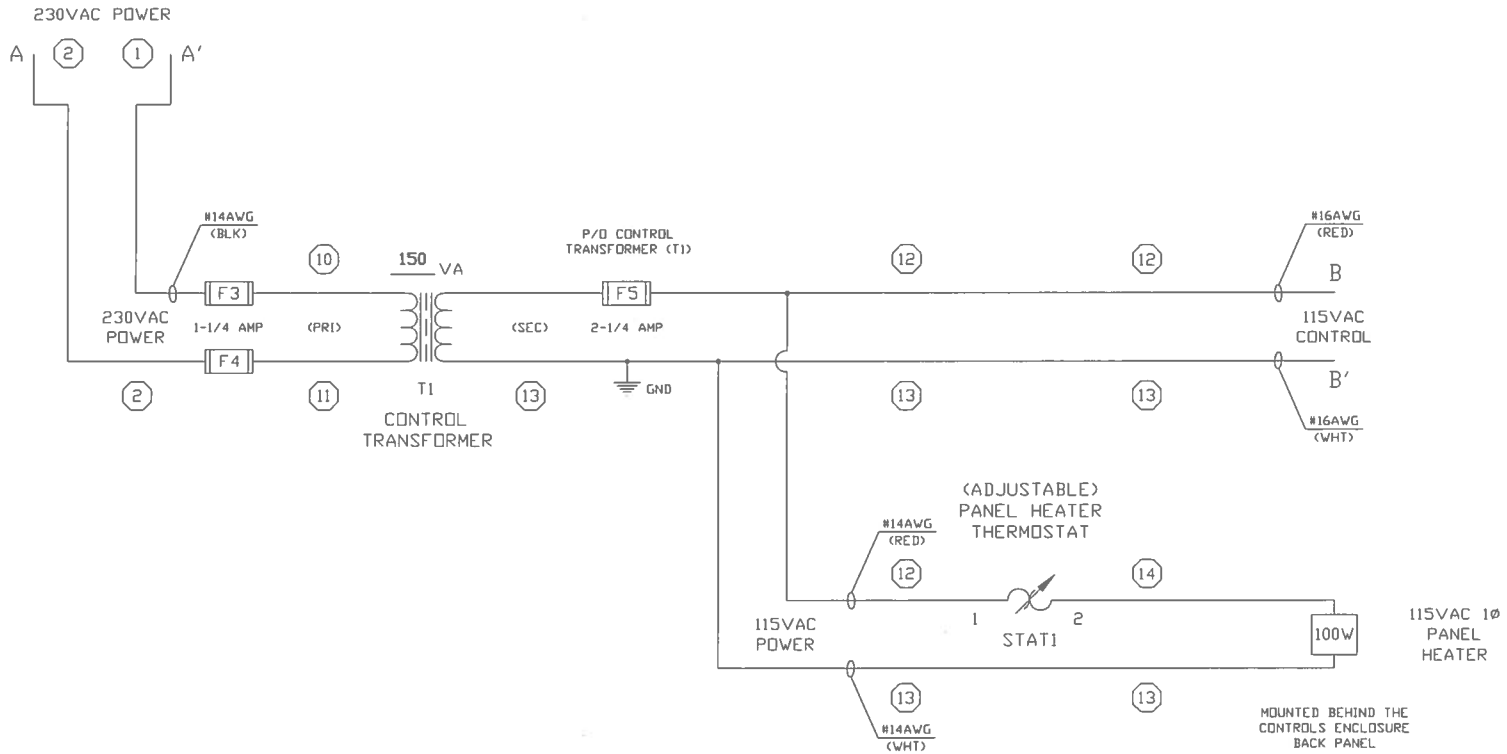
JOB No. 16-12852BCD

TOLERANCES (EXCEPT AS NOTED)
DECIMAL
FRACTIONAL
ANGULAR

REVISIONS
NO. DATE BY
1
2
3
4
5

EPG COMPANIES
PUMP CONTROLLER
230VAC 1Ø SH 1 OF 5

DESIGN RCK
DRAWN RCK
CHK'D
SCALE
DATE 12-20-16
APP'D
MATERIAL
DRAWING NO. 11656-0250



FOR NOTES AND REVISIONS SEE SHEET 5

AS BUILT

JOB No.	16-12852BCD

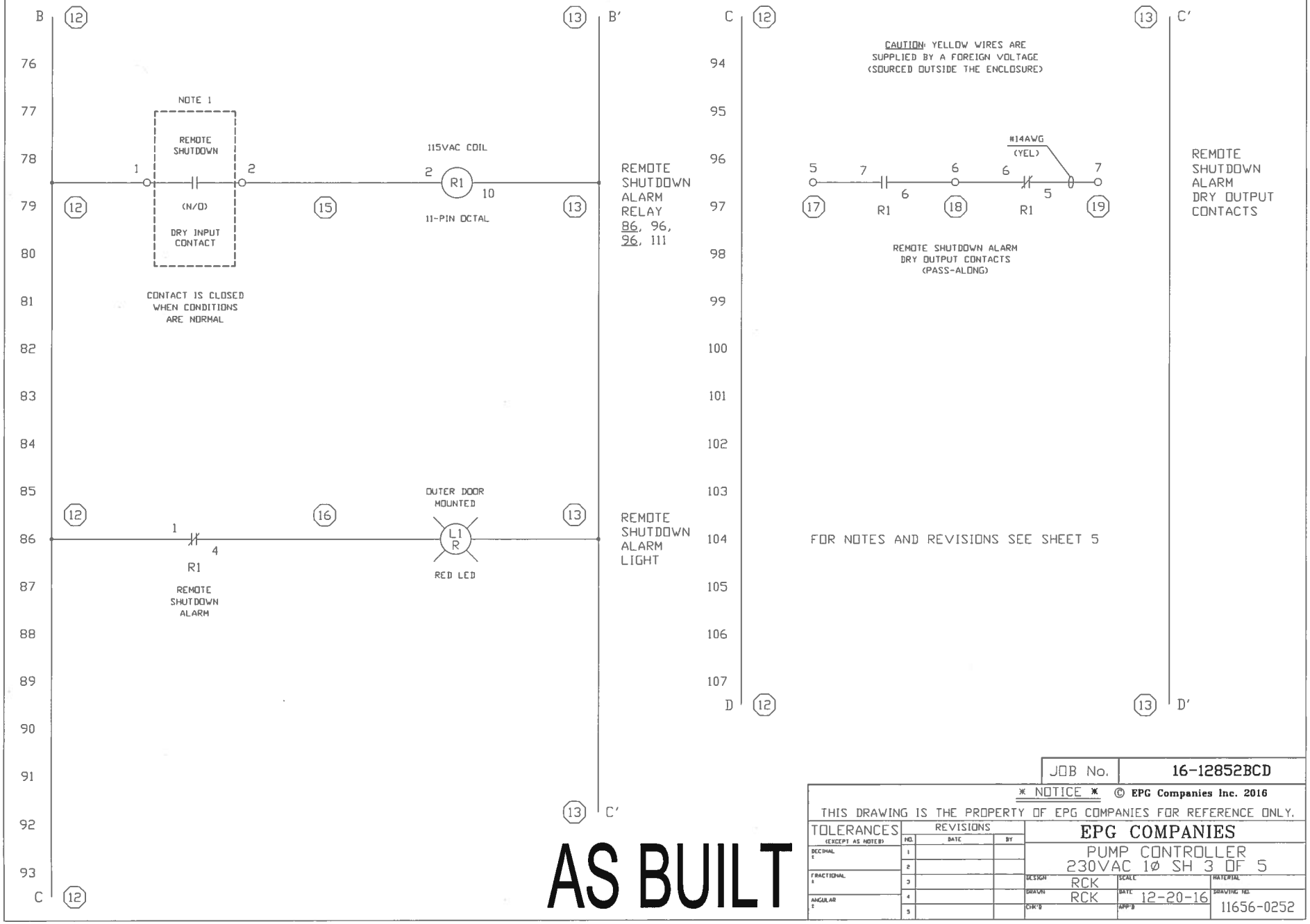
TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±

REVISIONS			
NO.	DATE	BY
1		
2		
3		
4		
5		

EPG COMPANIES

PUMP CONTROLLER
230VAC 1Ø SH 2 OF 5

DESIGN	RCK	SCALE	MATERIAL
DRAWN	RCK	DATE 12-20-16	DRAWING NO. 11656-0251
CHK'D		APP'D	



AS BUILT

JOB No.	16-12852BCD

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±

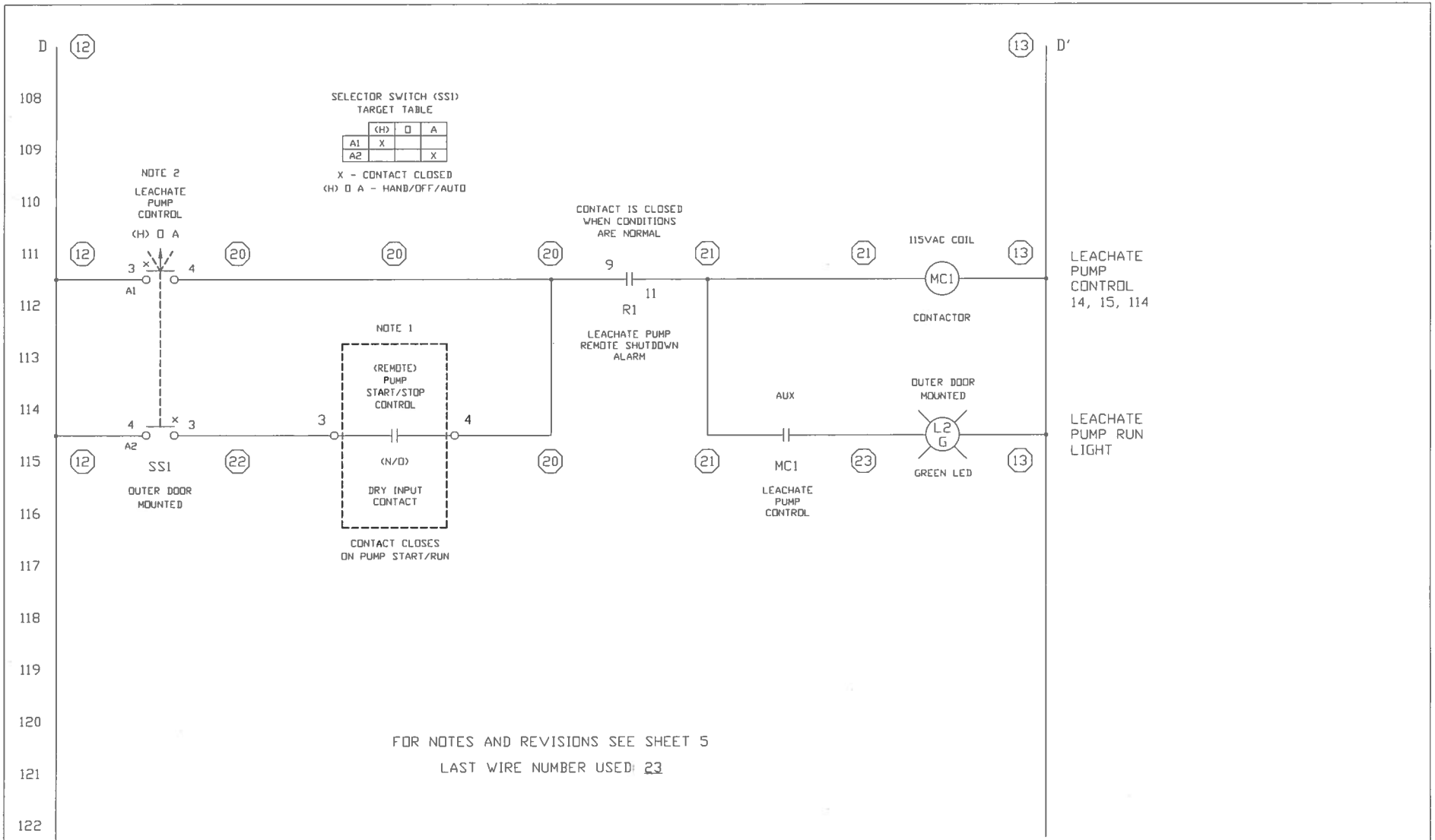
REVISIONS

NO.	DATE	BY
1		
2		
3		
4		
5		

EPG COMPANIES

PUMP CONTROLLER
230VAC 1Ø SH 3 OF 5

DESIGN	RCK	SCALE	MATERIAL
DRAWN	RCK	DATE 12-20-16	DRAWING NO. 11656-0252
CHK'D		APP'D	



FOR NOTES AND REVISIONS SEE SHEET 5

LAST WIRE NUMBER USED: 23

AS BUILT

JOB No. 16-12852BCD

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±

REVISIONS

NO.	DATE	BY
1		
2		
3		
4		
5		

EPG COMPANIES

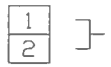
PUMP CONTROLLER
230VAC 1Ø SH 4 OF 5

DESIGN	RCK	SCALE	MATERIAL
DRAWN	RCK	DATE 12-20-16	DRAWING NO. 11656-0253
CHK'D		APP'D	

FIELD WIRING TERMINALS

REMOTE SHUTDOWN (DRY INPUT CONTACT)

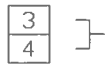
L/N 78



(N/O) REMOTE SHUTDOWN
(DRY INPUT CONTACT)

PUMP START/STOP (DRY INPUT CONTACT)

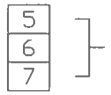
L/N 114



(REMOTE) (N/O)
PUMP START/STOP
(DRY INPUT CONTACT)

REMOTE SHUTDOWN ALARM (DRY OUTPUT CONTACTS)

L/N 96



REMOTE SHUTDOWN ALARM
W/1-N/O & 1-N/C
(DRY OUTPUT CONTACTS)
(PASS-ALONG)

NOTES:

1. NOT PART OF CONTROLLER
2. SELECTOR SWITCH, (SS1) WILL SPRING RETURN FROM THE "HAND" POSITION

AS BUILT

JOB No.	16-12852BCD

TOLERANCES (EXCEPT AS NOTED)	REVISIONS			EPG COMPANIES		
DECIMAL ±	NO.	DATE	BY	PUMP CONTROLLER 230VAC 1Ø SH 5 OF 5		
FRACTIONAL ±	1					
ANGULAR ±	2					
	3					
	4					
	5					

DESIGN	SCALE	MATERIAL
RCK		
DRAWN: RCK	DATE: 12-20-16	DRAWING NO.: 11656-0254
CHK'D	APP'D	

EPG Controllers With Intrinsically Safe Circuit(s)

Field Installation Instructions

PURPOSE: Provide instructions to install EPG control panels with Intrinsically Safe (IS) Circuits wired to EPG Level Sensors, EPG Flow Sensors, and Single and Dual Level Float Sensors.

PROCEDURE:
Familiarize yourself with the electrical components and the panel electrical schematics. Read these instructions thoroughly before attempting installation of intrinsically safe circuits. Reference: Installation of intrinsically safe instrument systems in CLASS I HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.

Install in accordance with Article 504 of the National Electrical Code.

This control panel and its intrinsically safe circuit(s) must be connected to a ground system with very low impedance (1 OHM or less) per NEC 504-50 and 250-50.

See control panel drawings for device wiring. Only simple apparatus (NEC 504-2) and those specifically called out in the controller drawing are to be connected to the intrinsically safe circuit(s). The attached drawings show specific device wiring for level, flow, single level float and dual level float sensors.

Where intrinsically safe circuits enter or exit a hazardous (classified) area, a means must be provided to prevent the passage of gases or vapors per NEC 501-5. A seal device must be installed to conduit entering the enclosure and then filled with appropriate sealant.

Wiring of intrinsically safe circuits shall be physically separated from non-intrinsically safe circuits per NEC 504. Do not run intrinsically safe and non-intrinsically safe circuits in the same conduit.

Do not exceed maximum cable lengths stated in the control panel drawings.

Field wiring supplied by others is to have 600 Volt insulation rating.

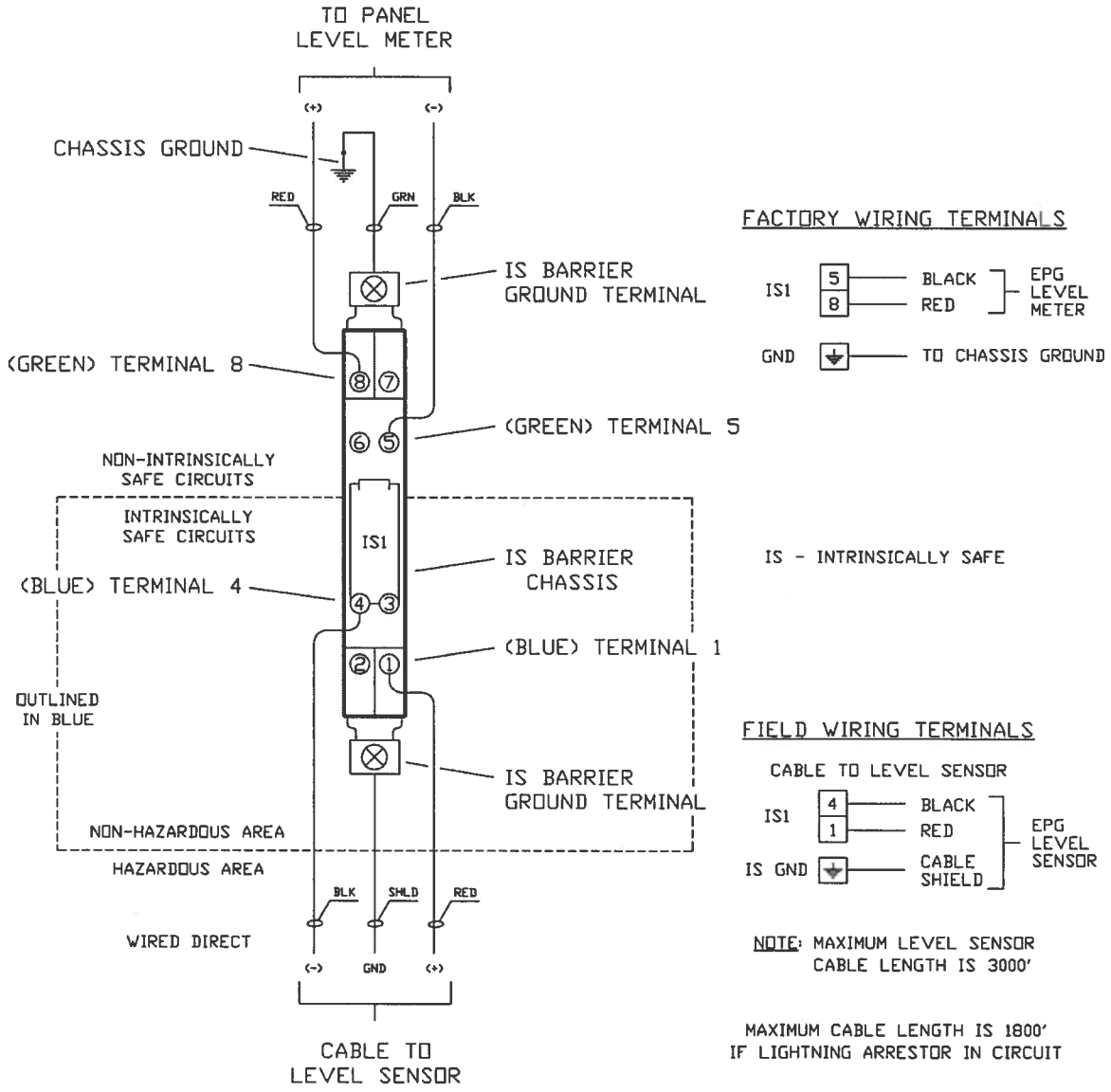
Conductors of intrinsically safe circuits must be separated by at least 5" from conductors of any non-intrinsically safe circuits.

If field wiring is terminated in field supplied junction boxes there must be a minimum of 8" between intrinsically safe and non-intrinsically safe field wiring terminals.

Do not substitute parts. Use only the same make, model, and part number as originally supplied.

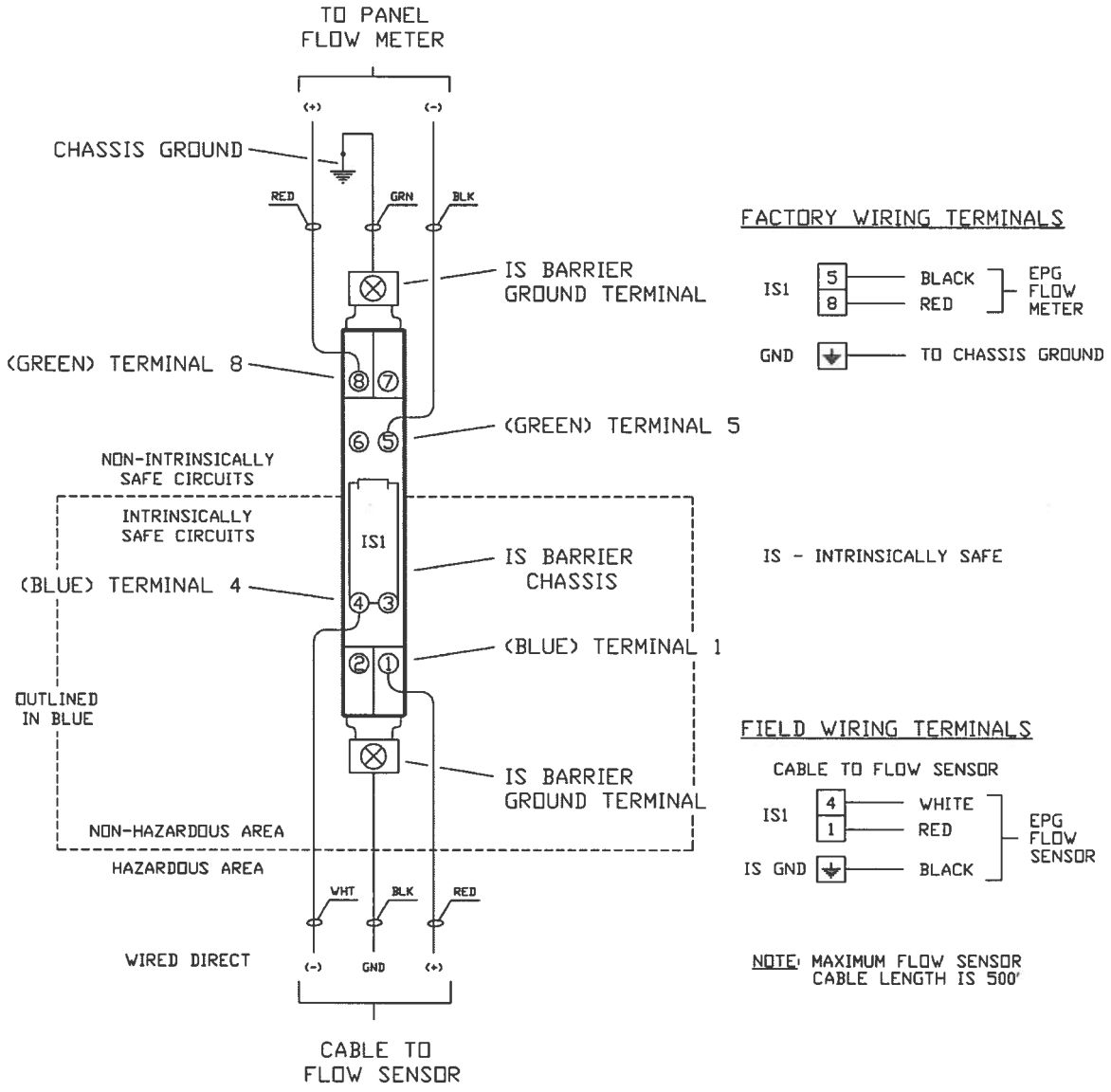
Replace fuses only with fuses of same type and rating.

IS BARRIER - LEVEL SENSOR



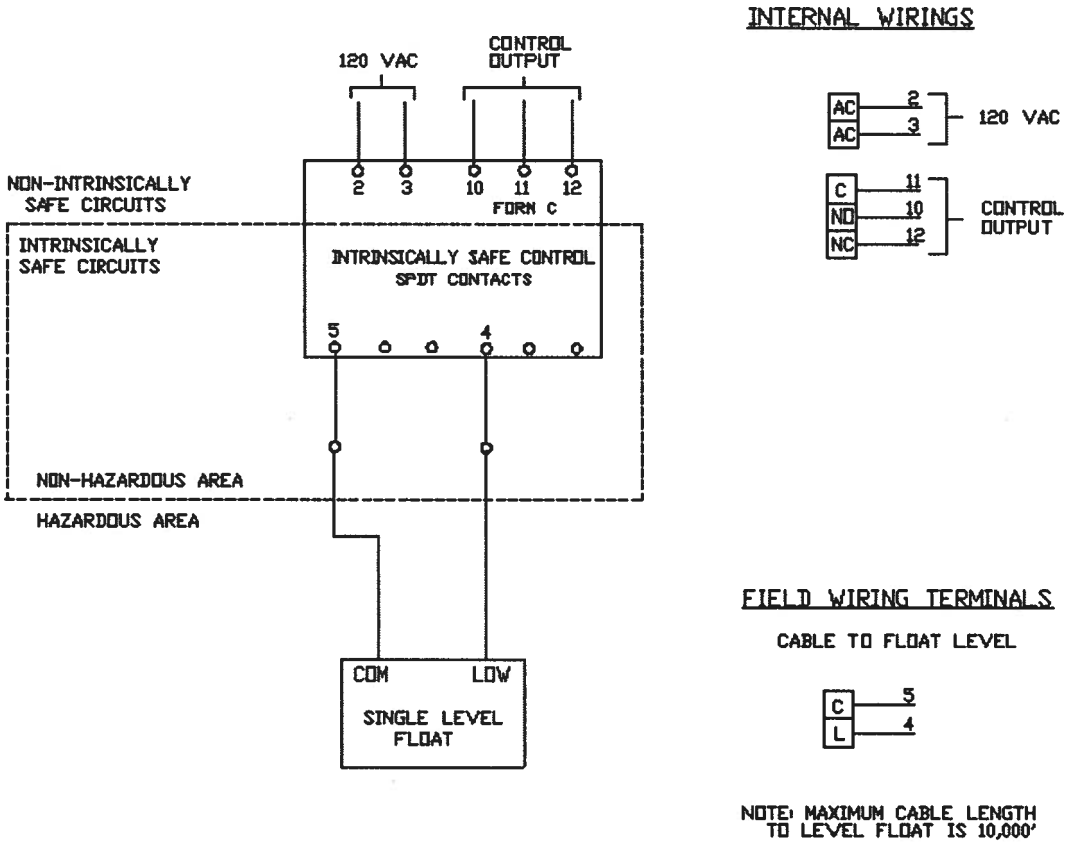
NOTE:
1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS C & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000B.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO EPG LEVEL SENSOR IS 3000 FEET. MAXIMUM LENGTH IS 1800 FEET IF LIGHTNING ARRESTOR IN LEVEL SENSOR CIRCUIT.

IS BARRIER - FLOW SENSOR



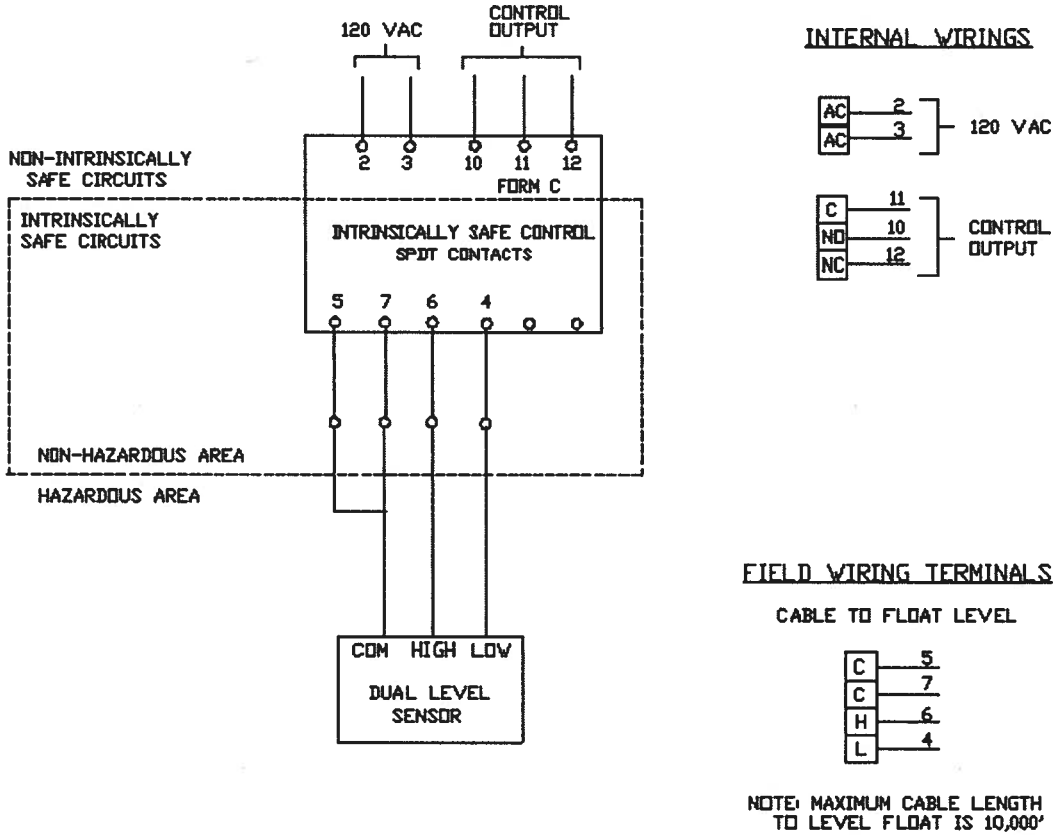
NOTE: 1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS C & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000B.
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE SYSTEMS IN CLASS I HAZARDOUS LOCATIONS, ANSI/ISA-RP 12.6-1987, SECTION 4.5.4.
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504 OF THE NATIONAL ELECTRICAL CODE.
5. MAXIMUM CABLE LENGTH TO EPG FLOW SENSOR IS 500 FEET.

I.S. RELAY BARRIER - SINGLE LEVEL



NOTE:
1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS A, B, C, & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000B
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE INSTRUMENT SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/NFPA 70
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504, 2011 OF THE NATIONAL ELECTRICAL CODE
5. MAXIMUM CABLE LENGTH TO LEVEL FLOAT SENSOR IS 10,000 FEET

I.S. RELAY BARRIER - DUAL LEVEL



NOTE:
1. PROVIDES INTRINSICALLY SAFE CIRCUIT EXTENSIONS FOR USE IN CLASS 1 GROUPS A, B, C, & D HAZARDOUS LOCATIONS WHEN CONNECTED PER EPG BULLETIN 8000B
2. REFERENCE INSTALLATION OF INTRINSICALLY SAFE INSTRUMENT SYSTEMS IN CLASS 1 HAZARDOUS LOCATIONS, ANSI/NFPA 70
3. WARNING SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.
4. INSTALL IN ACCORDANCE WITH ARTICLE 504, 2011 OF THE NATIONAL ELECTRICAL CODE
5. MAXIMUM CABLE LENGTH TO LEVEL FLOAT SENSOR IS 10,000 FEET

EPG LevelMaster™ Level Meter

Model CH1000-SDHH

OPERATION & SET UP INSTRUCTIONS

The EPG LevelMaster system uses a submersible pressure transmitter to detect changes in fluid levels and a programmable meter featuring a digital LED display and front panel keypad to monitor and control fluid levels. The user can program the desired control parameters for a single pump and one other high level control function. The LevelMaster display is in inches unless otherwise programmed. During a pumping and/or an alarm condition, the display alternates between the message and the current liquid level reading. The message indicates which function is active (see below).

GENERAL SETUP OPERATIONS

IMPORTANT: During setup, if three (3) minutes elapse without a keypad entry the meter automatically returns to the run mode without the entered changes being stored. **DO NOT USE FINGERNAIL OR OTHER SHARP OBJECT TO PROGRAM METER. DAMAGE TO KEYPAD MAY RESULT.**

DISPLAY	INSTRUCTION
SETUP	At this prompt, enter the lockout code (35) in order to enter the set point setup mode.
Pr Hl	At this prompt, followed by the current setting, select the Pump Relay High set point. This is the **pump ON** set point.
Pr Lo	At this prompt, followed by the current setting, select the Pump Relay Low set point. This is the **pump OFF** set point.
AL Hi	At this prompt, followed by the current setting, select the Alarm High Relay set point. This is the **high level alarm** set point.
Hy Hi	At this prompt, followed by the current setting, select the hysteresis for the Alarm High Relay set point. This value, when subtracted from the high level alarm set point, sets the **shut off point for the high level alarm**.
AL H2	At this prompt, followed by the current setting, select the Alarm High-High Relay set point. This is the **high-high alarm** level set point and is factory set.
Hy H2	At this prompt, followed by the current setting, select the hysteresis for the Alarm High-High Relay set point. This value, when subtracted from the high-high level alarm set point, sets the **shut off point for the high-high level alarm** and is factory set.

DISPLAY	MESSAGE
P	Pump activated. "P" and the current level reading will alternate on the display.
HiP	High alarm & pump activated. "HiP" and the current level reading will alternate on the display.
HiPH2	High-High alarm & pump deactivated. "HiPH2" and the current level reading will alternate on the display.

SET UP PROCEDURES FOR SIMPLEX OPERATION – SDHH METER

STEP NO.	ACTION
1	Push SETUP/ENTER button. Wait for the meter to display 0.
2	Push arrow buttons to set a value of 35 on meter display. Push SETUP/ENTER.
3	Meter shows **Pr Hl** (pump ON set point) followed by current value.
4	Push arrow buttons to set the desired level for pump ON. Push SETUP/ENTER button.
5	Meter shows **Pr Lo** (pump OFF set point) followed by current value.
6	Push arrow buttons to set the desired pump OFF level. Push SETUP/ENTER button.
7	Meter shows **AL Hi** (High Level Alarm) followed by current value.
8	Press arrow buttons to set desired high level alarm point. Push SETUP/ENTER button.
9	Meter shows **Hy Hi**. Press arrow buttons to select how far below the high level point the alarm will shut off. Push SETUP/ENTER button.
10	Meter shows **AL H2** (High-High level alarm set point) followed by current value. Factory setting is 150.0". **NOTE: This fail safe feature shuts off the pump if the level sensor fails and should not be changed in the field.**
11	Meter shows **Hy H2**. Press arrow buttons to select value of 0.0". Not used.
12	Push SETUP/ENTER button. Meter returns to normal operation.

EXAMPLE:

If the desired levels for the pump were:	Pump ON	18.0"
	Pump OFF	12.0"
	High Level Alarm	30.0"
	High Level Alarm Hys.	1.0"

Complete steps 1 – 3 above.

Select **18.0** with arrow buttons for the **Pr Hl** value. Push SETUP/ENTER.

Pr Lo is displayed, select **12.0** with the arrow buttons for the Pump OFF value. Push SETUP/ENTER.

AL Hi is displayed, select **30.0** with the arrow buttons for the High Alarm value. Push SETUP/ENTER.

Hy Hi is displayed, select **1.0** with the arrow buttons for the High Level Alarm OFF value (value determined by subtracting from high-level-alarm set-point). Push SETUP/ENTER.

INSTALLATION NOTES AND TROUBLESHOOTING

BACKGROUND: Numerous installations of the EPG LevelMaster system have proven its long-term reliability. The majority of malfunctions of the LevelMaster system are the result of improper installation and handling of the pressure transmitter sensor. During new installations, be certain to check for any shipping damage, loose controller connections or parts that may have come loose during shipment.

CAUTION
Do not use any other programming codes other than setup code (35).

SYMPTOM / DISPLAY	PROBABLE CAUSES	HOW TO CORRECT
Continuous above full scale reading (above 139"), or Continuous reading.	If pump has been off for a long period of time, liquid level may actually be quite high.	Reprogram meter if above 150" or pull pump up slightly to initiate pump start.
	Loose connections in circuit.	Repair connections in controller.
	Short circuit in sensor lead wire or connector or circuit.	Inspect for shorted connections at breakout box (junction box) and at controller. If connections are good, replace sensor.
	Faulty sensor.	Replace sensor.
-34.6 reading.	Lead wire damaged or reversed connections.	Check schematic, repair connections.
	Open circuit in sensor lead wire or controller connections.	Replace sensor and lead wire. Test IS barrier and meter with simulator.
	Faulty power supply in meter.	Replace meter.
Erratic readings.	Damaged sensor lead wire.	Check schematic, repair connections.
	Improper connections.	Replace sensor and lead wire. Test meter with simulator.
	Faulty meter.	If faulty meter, replace meter.

Pump starts at normal reading, runs for a few seconds and stops.	Low liquid recovery rate. Screen on pump may be clogged.	Remove pump and clean screen. May also need to disassemble pump and clean pump impellers.
	Sump clogged or plugged.	Remove pump and clean out sump.

FACTORY SETTINGS

LevelMaster Model SDHH Meter

Panel S/N: _____

Meter S/N: _____

Meter Designation: _____

Operating Parameters – Setup Code 35

PARAMETER	VALUE	OPERATION
Pr Hl	inches	Turns Pump ON when level on meter reads ___
Pr Lo	"	Turns Pump OFF when level on meter reads ___
AL Hi	"	Turns High Level Light ON when level on meter reads ___
Hy Hi	"	Keeps High Level Light ON until level drops ___ below AL Hi
AL H2	"	Turns Pump OFF when level meter reads 150.0 Greater indicates a probable level sensor failure.
Hy H2	0.0	Not used

NOTE: If the up arrow is pressed any time that the meter is operating, the highest level that the meter has observed since power was applied will be displayed.

CH1100 Operations & Configuration Manual

EPG Companies Inc.
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Maple Grove, MN 55311
800-443-7426 * www.epgco.com
Tech Support * 800-762-8418

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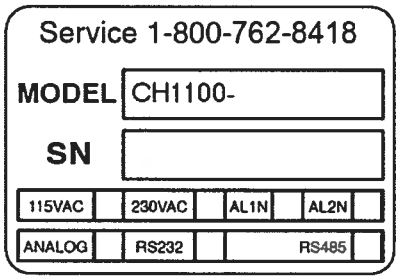
INTRODUCTION

The CH1100 Indicating controller is the heart of the EPG Level Master System. The level is determined by detecting changes in hydrostatic pressure using a submerged stainless steel pressure transducer. The EPG Level Indicating Controller 'reads' the corresponding analog current and uses one or two of the three internal relays to turn on and off pumps. Pump control can be either in pump up or pump down modes with either one or two pumps controlled. The relays can also be used as alarms outputs and can be fully configured for failsafe operation. The feature-rich CH1100 includes optional analog output (a re-transmitted, powered 4-20mA), an internal, 24VDC transmitter power supply and digital inputs (used for pump disable or monitoring pump on/off status & run time). The supply power can be 24VDC, 120VAC or 240VAC. The CH1100's standard configuration is in inches, but can be field configured to any other units required.

1.0 Installation

The power requirements for the meter are listed on the label located on the top of the case. Use only the power indicated. The label also indicates any optional installed hardware that may be installed. The pre-set factory configuration of the meter is also listed. The settings of the meter and the alarms can be changed in the field however prior to unattended operation, it is good practice to confirm all parameters via the display (see configuration guide on page 8).



1.1 Mounting

The CH1100 mounts in a standard horizontal 1/8 DIN panel opening. The case mounted "ears" attach to the side of the meter case after it is inserted in the panel. The installation screws supplied with the meter can then be tightened to secure the meter.
DIMENSIONS: Face: 3.75" (95mm) X 1-7/8" (46mm) Depth (back of Panel): 4.5" (114mm) Panel Cutout: 3.5" (90mm) X 1- 11/16" (43 mm).

1.2 Connections

The rear of the meter may have up to three terminal strips. The main 14 terminal strip (J1) is the standard. If options are present then two shorter terminal strips (J2 & J3) will be present and physically located above J1.

J1

1	2	3	4	5	6	7	8	9	10	11	12	13	14
H	N	G	C	K1	K1	K2	K2	K3	K3	+24	S+	S-	C

1 - VAC Hot / DC+
2 - VAC Neutral / DC-
3 – Ground
4 – Common
5 – Pump Relay #1
6 - Pump Relay # 1
7 – Alarm Relay #1
8 – Alarm Relay #1
9 – Alarm Relay #2
10 – Alarm Relay #2
11 - +24VDC @ 100mA
12 – SIGNAL I/P sinking(+)
13 - SIGNAL I/P sinking (-)
14 – Common
SEE NOTES BELOW RE: Inputs

J2

1	2	3	4	5	6	7	8
C	P2	P1	C	HOA2	HOA1	-A/O	+A/O

1 - Common (Pulse return)
2 – RUN / Pulse I/P# 2 (5-50VDC)
3 – RUN / Pulse I/P#1 (5-50VDC)
4 – Common (HOA return)
5 – Float/HOA switch I/P Disable #2
6 – Float/HOA switch I/P Disable #1
7 – Re-transmitted level 4-20mA (-)
8 – Re-transmitted level 4-20mA (+)

NOTES:
All relays Form A rated 5A @ 120 VAC
Use Terminals 12 (+) and 13 (-) for sinking inputs (i.e. 2 wire transmitters)
Use terminals 13(+) and 14(-) for sourcing inputs (i.e. 4 wire transmitters)

RUN MODE

2.0 Levels and Alarms

During normal operation the meter will display the real time process level in the units (inches, centimeters etc) in which the level transducer and the CH1100 were calibrated during setup. During normal operation the display indicates the process level. If the meter is in alarm or a pump is on, every 15 seconds the display will toggle to briefly indicate this status (i.e. AlHi, P etc.). Pressing the UP and DOWN arrows simultaneously will cause the METER TYPE to be displayed.

2.1 Min / Max

During normal operation pressing either the UP or DOWN arrows will cause the most recent minimum or maximum process level values recorded by the meter since the last active meter reset. An Active Reset is performed by simultaneously pressing the UP arrow (max reset) or DOWN arrow (Min reset) and the SETUP/ENTER key together.

2.2 LED Indicators

There are three LED's located vertically on the left side of the display that indicate the meter's real time operating status.

The TOP LED flashes in alarm if the communications option board is present and the communication has failed. A small LED to the left of this LED flashes if the option is installed and the meter is communicating.

The MIDDLE LED is non-operational and reserved for future use.

The BOTTOM LED is ON if either a local or remote pump lockout is enabled.

2.3 Real Time Digital Input Status

Press the SETUP/ENTER key momentarily. The display will read ZERO. Enter a Setup Code value of 2 by pressing the UP arrow twice and press the SETUP/ENTER key. The display will show 'd????'. Each '?' will be either a 1 (on) or 0 (off) with each digit representing the status of a local digital inputs. The meter will continue to monitor and control the pumps while this operation is performed.

CONFIGURATION PROCEDURE

The meter when first plugged in will quickly perform a startup routine confirming the operation of all the LED segments. It will then display the current input value. If there is no input and the meter was setup at EPG, (EPG standard configuration is for a 0-5PSIG input with 4-20mA output) the meter will display –34.6. In order to change any set points or internal values, one must enter the respective SETUP MODE as defined in the Setup Guide on page 10 of this manual. To enter a SETUP MODE (25, 35, 45) simply firmly press the SETUP/ENTER key momentarily. Upon release the meter's display will indicate ZERO. Using the UP/DOWN arrow keys, increment this value to the desired entry code (25, 35, or 45) and press the SETUP/ENTER key. The meter will automatically step to the next menu item. The meter will display the next menu item briefly and then either wait for an entry or toggle to show the current value. Use the UP/DOWN keys to set the required value.

Pressing the SETUP/ENTER key will enter this value into the meter's internal memory and increment the display to the next menu item.

**** Keyboard inactivity for more than three minutes will cause the meter to exit the setup mode and return to the run mode.***

METER SETUP MODE (CODE 45 – configure first)

3.0 METER TYPE

The meter can be configured for 6 different pump control actions as follows:

#	CODE	EQUIPMENT	ACTION	ALARM #1	ALARM #2
1	SdHL	Single Pump	Pump Down	Hi	Lo
2	SdHH	Single Pump	Pump Down	Hi	Hi Hi
3	ddH	Dual Pump	Pump Down	Hi	P2 On/Off
4	SuHL	Single Pump	Pump Up	Hi	Lo
5	SuHH	Single Pump	Pump Up	Hi	Hi Hi
6	DuH	Dual Pump	PumpUp	Hi	P2 On/Off

NOTES:

1. Control mode types 1, 2, & 3 may also be referred to as emptying or pump out and modes 4, 5 & 6 may be referred to as filling or pump in.
2. The alarm relays are ALL Normally Open (fail safe) and can be field configured as Normally Open or Normally Closed (see 3.4 & 3.5 below).

3.1 20mA CALIBRATION

The meter is delivered from EPG pre-calibrated. Under normal operation this setting should NEVER be adjusted. If re-calibration is required consult your EPG representative.

3.2 MODBUS ADDRESS (*Addr = 1- 240*)

Use the UP/DOWN arrow keys to enter the desired Modbus address and press the SETUP/ENTER key. This is only active if this option is installed

3.3 MODBUS Serial Baud Rate

The communication transfer rate can be toggled between 1200 Baud (bd-12) and 9600 Baud (bd-96) using the UP/DOWN arrows. This is only active if the option is installed.

3.4 2nd Alarm Contact Configuration (terminals 9 & 10)

Use the UP/DOWN arrows to toggle between Normally Open & Normally Closed relay configuration for relay #2 associated with the second alarm of Single Pump Systems or the Pump 2 function of dual pump system.

3.5 1st Alarm Contact Configuration (terminals 7 & 8)

Use the UP/DOWN arrows to toggle between Normally Open & Normally Closed relay configuration for the relay associated with the HI alarm.

METER OPERATIONS MODE (CODE 35 – sets alarm & pump control points)

4.0 Menu Items Overview (described below) for METER TYPE

Step #	SdHL	SdHH	ddH	SuHL	Suhh	duH
1	PrHi	PrHi	PrHi	PrHi	PrHi	PrHi
2	PrLo	PrLo	PrLo	PrLo	PrLo	PrLo
3	AlHi	AlHi	PrHi2	AlHi	AlHi	PrHi2
4	HyHi	HyHi	PrLo2	HyHi	HyHi	PrLo2
5	AlLo	AlHi2	AlHi	AlLo	AlHi2	AlHi
6	HyLo	HyHi2	HyHi	HyLo	HyHi2	HyHi

4.1 PrHI (Relay #1 – terminal strip J1 #5 & 6)
This is the upper on or off set point for the main pump control and is adjusted using the UP/DOWN arrow keys.

4.2 PrLo
This is the lower set point for the main pump control and is adjusted using the UP/DOWN arrow keys.

4.3a AlHi (Relay#2 – terminal strip J1 #7 & 8)
Use the UP/DOWN arrow keys to adjust the Hi Alarm. ***OR***
4.3b PrHi2
This is the upper on or off set point for the secondary pump in a lead/lag control situation. It is adjusted using the UP/DOWN arrow keys.

4.4a HyHi
The High alarm hysteresis determines the value by which the process must deviate from the alarm set point before the relay returns to its normal state.
OR
4.4b PrLo2
This is the lower on or off setpoint for the secondary pump control and is adjusted using the UP/ DOWN arrow keys.

4.5a AlLo (Relay#3 – terminal strip J1 #9 & 10)
Use the UP/DOWN arrow keys to set a lower alarm limit for a single pump system.
OR
4.5b AlHi2 / AlHi
Use the UP/DOWN arrow keys to adjust the Hi/Hi or Hi Alarm for single or dual pump systems. 4.6 HyLo or HyHi (Same as 4.4a above)

METER SCALING SETUP (Setup Code 25 - scales display)

5.0 DECIMAL POINT

Using the UP / DOWN arrow keys the decimal point can be moved to the left or the right providing the resolution required for the application.
NOTE: Moving the decimal point to the far right will cause it to be "hidden".

5.1 SCALING FACTOR

It is necessary to cause the display counts (0-2000) to read in actual engineering units. . This is done using a Scaling Factor and a Scaling Offset Factor.
Using the factory standard level transducer as an example (0 – 5 PSI two-wire transducer scaled in inches with an output of 4 – 20mA's) these factors are calculated as follows.

Scaling Factor = Desired Reading Range / Max. Display Count

Therefore: The URL (5 PSIG) converted to inches is 138.55" (5 X 27.71" H2O per 1 PSI)
Because the transducer is "zero based" (0-138.55") and the current output is "live" (4-20), 25% or (1/4) of the URL value must be added: 138.55 / 4 = 34.64 + 138.55 = 173.19 or ~173.2

Remove the decimal point for calculation: 1732 / 2000 = .866 >> **The scaling factor is: .866**

5.2 SCALING OFFSET

It is now necessary to perform an offset or to suppress the above range to Zero. The factory default for the 0-5 PSIG transducer with a 4-20mA Output is –34.6
The standard equation for doing this is: The negative value of (Suppressed Range (4mA) / Active Range (16mA)) * Desired Units Full Scale

- (4 / 16) * 138.55 = **-34.6 >> The offset factor is: -34.6**

TROUBLESHOOTING TIPS

1. Pressing the UP/ DOWN arrows simultaneously will cause the meter to display its current configuration and alarm type.
2. Confirm power to all devices and equipment
3. Check configuration of meter (including decimal point location)

OPTIONS (CH1100)

DIGITAL INPUTS & ANALOG OUTPUT (+AO option)

6.0 Pump Run Status (terminal strip J2 #1,2 & 3)

There are two local digital inputs that can be used to monitor pump operation or other conditions. Internally generated 'bits' in the Digital Input Register reflect the inputs' current state. These inputs also have associated internal registers that:

a) count the number of pump starts &
b) accumulate a "runtime" in tenths of hours

These two inputs (terminals 2 & 3) also share a common return (term.#1) and are polarity insensitive. In addition there are internal registers that accumulate the number of starts and the runtime based on the meter's own pump relay outputs. All this information can only be accessed by using optional RS-232/485 communications port (CH1200).

6.1 Lockout Inputs (terminal strip J2 #4, 5 & 6)

There are two local digital inputs that can be used to disable the pump control operation. They may be used with floats or other "backup" limit / lockout conditions. They may also be used to sense the run / off / auto conditions from an HOA switch.
The connections are not polarity sensitive and share a common return (term#4).

NOTE: These disable terminals DO NOT replace standard lock out procedures used when performing maintenance on equipment. Proper safety procedures should always be observed when working on or around all electrical equipment.

6.2 Analog Output (terminal strip J2 #7 & 8)

An analog output (4-20mA) proportional to the level input is re-transmitted from terminals 7 & 8 of the J2 option board. If the input loop is open (0 mA) then the re-transmitted output will read Zero and not 4mA.

6.3 Remote Lockout (communications option required—CH1200)

Register DOREG1 can be written to from the Modbus Master. Bit 0 set to 1 will inhibit pumping until reset. This bit is similar to local Lockout inputs in preventing the pump output from activating. Any Lockout condition is indicated by the Lower Status LED at the left side of the display.
NOTE: The periodic status message showing "P" indicating the level is such that the pump would normally be required to run will continue to flash despite an active Lockout that prevents the pump relay from actually energizing.

Read Keyboarding Tips First!!

SETUP / ENTER — *Press momentarily & release, then increment to desired Setup Menu value (45,35 or 25)*

45 Meter Setup Mode

SETUP / ENTER

METER TYPE — -SdHL, -SdHH, -ddH, -SuHL, -SuHH, -duH — *Select meter type using up/down arrows, see page 2 for details*

20mA → *Meter 20ma Input value (see note on page 3)*

Addr → *Use the up/down keys to set the address from 0 - 32,212*

Bd-?? → *Use the up/down keys to toggle between 1200 to 9600 Baud Rate*

A2n ?? — *Alarm # 2 Relay Action: Use the up/down keys to toggle between N.O. & N.C.*

A1n ?? — *Alarm # 1Relay Action: Use the up/down keys to toggle between N.O.& N.C.*

35 Operations Mode - Alarm & Pump Control Set Points

SETUP / ENTER — *Menu items below may change as per "Meter Type" selected in 45*

Pr Hi → *Set value using up/down arrows*

Pr Lo → *Set value using up/down arrows*

AL Hi → *Set value using up/down arrows*

Hy Hi → *Set value using up/down arrows*

AL Lo → *Set value using up/down arrows*

Hy Lo → *Set value using up/down arrows*

25 Scaling Setup

SETUP / ENTER

dECPt → 8888.8 — *Move decimal point by repeatedly pressing up/down arrows*

SCALE → *see page 3 description*

oFFSEt → *see page 3 description*

* KEYBOARDING TIPS: (Read first)

- *Avoid using sharp object to press keys (i.e. fingernails etc.).*
- *Firmly press each key momentarily.*
- *Press SETUP/ENTER after each setting and display will automatically advance to the next menu item*
- *Configure Setup Code **45** first*
- *Keyboard inactivity for three minutes will cause meter to exit setup mode and return to display mode.*
- *See attached sheet for further details on menu items*
- *All the relays Fail Open on power loss*

METER SETTINGS

LevelMaster™ Model CH1100 Meter

Panel S/N: _____

Meter S/N: _____

Meter Designation: _____
Meter Type: _____
Meter Relay 1 Function: _____
Meter Relay 2 Function: _____
Meter Relay 3 Function: _____

Relay 1 Contacts: _____
Relay 2 Contacts: _____
Relay 3 Contacts: _____

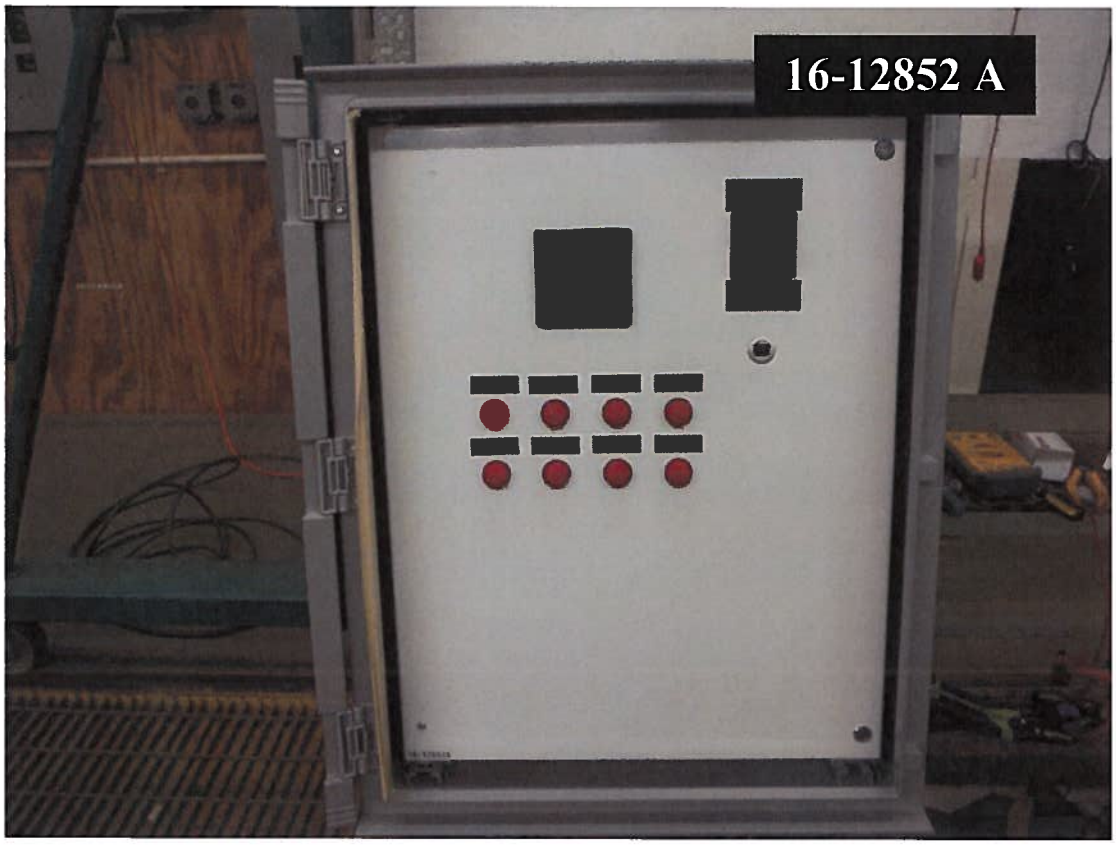
Operating Parameters –

PARAMETER	UNITS	OPERATION
DECPt	888.8	Sets meter display decimal point.
SCALE	.866	Sets meter scale to read in inches (5 psi pressure transducer).
oFFSE	-34.6	Sets meter display for input = 0 ma (5 psi pressure transducer).
PrHi	_____	Relay 1 (K1) turns on when meter displays = _____
PrLo	_____	Relay 1 (K1) turns off when meter displays = _____
ALHi	_____	Relay 2 (K2) turns on when meter displays = _____
HYHi	_____	Relay 2 (K2) turns off when display drops _____ below R2 Level
ALHi2	_____	Relay 3 (K3) turns on when meter displays = _____
HYHi2	_____	Relay 3 (K3) turns off when display drops _____ below R3 Level

Notes:

EPG Companies Inc.
19900 County Road 81
Maple Grove, MN 55311
800-443-7426 * www.epgco.com
Tech Support * 800-762-8418


16-12852 A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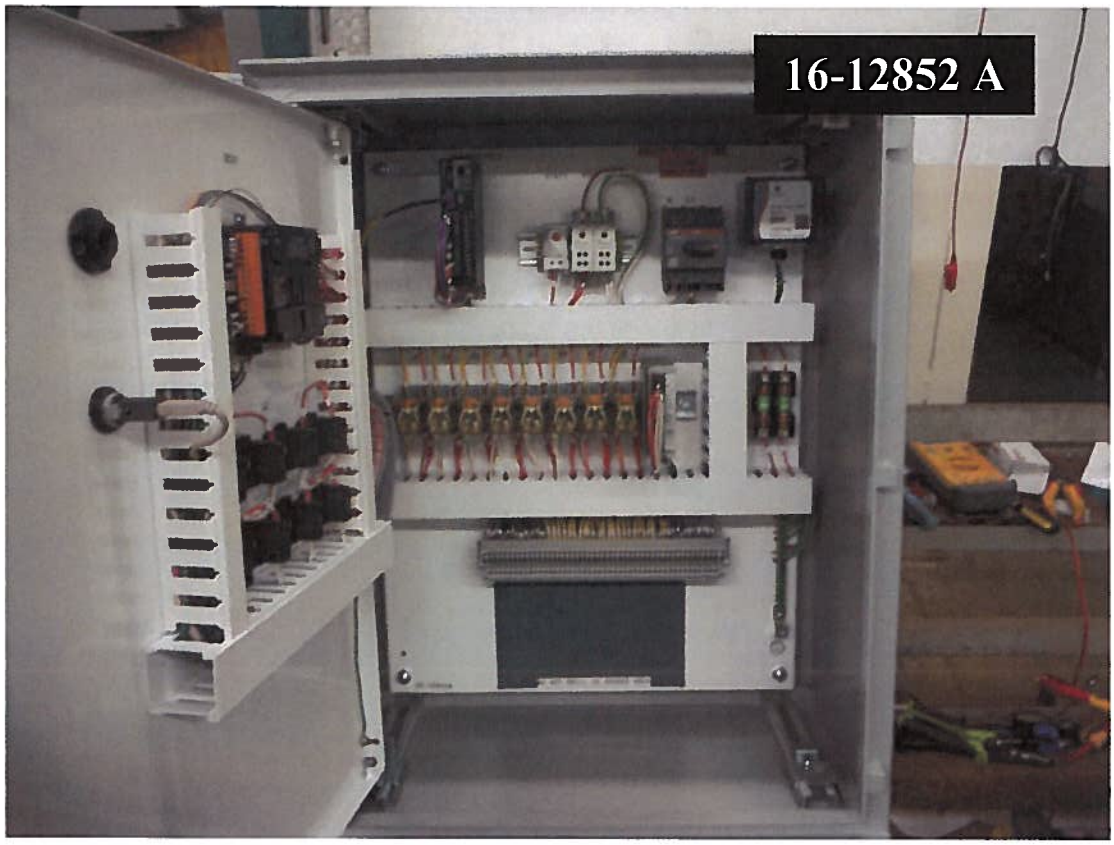
16-12852 A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16-12852 BCD
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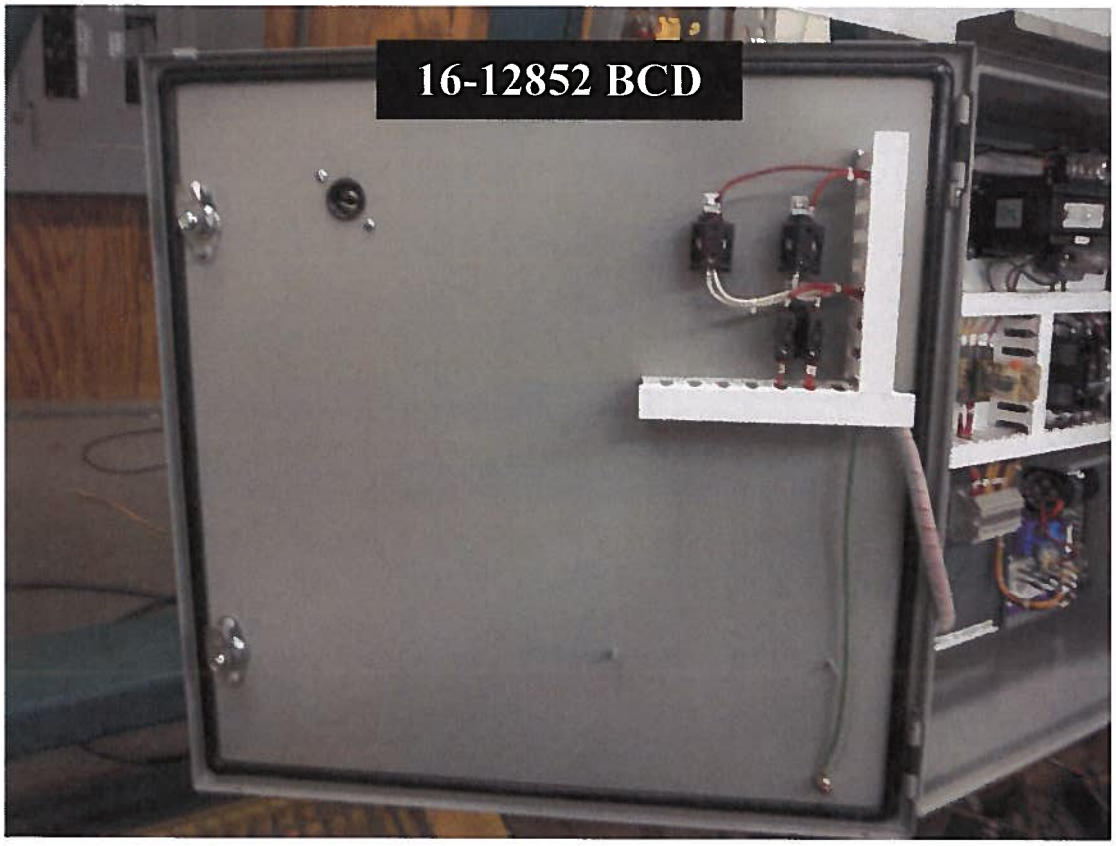
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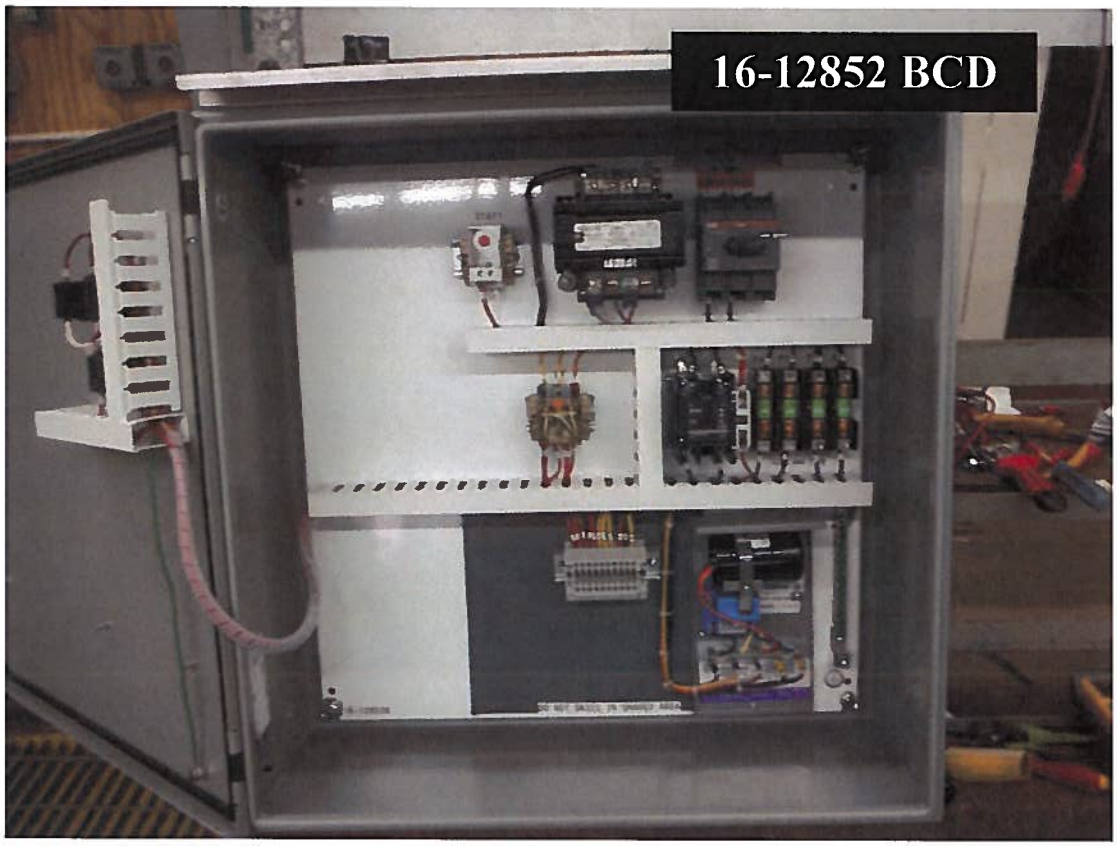

16-12852 BCD

LIMITED WARRANTY

This agreement shall be deemed to have been entered into in the State of Minnesota, and shall be construed in accordance with the laws of the State of Minnesota, including Minnesota's enactment of the Uniform Commercial Code. Buyer hereby stipulates and agrees that Hennepin County, Minnesota shall be the proper jurisdiction for adjudicating all claims and controversies arising from this agreement.

Products manufactured by EPG Companies Inc. are warranted for a period of 12 months if Form 200 is returned (see Bulletin 0202), from date of installation or eighteen (18) months from date of manufacture* to be free from defects of materials and workmanship. It is expressly agreed that the exclusive remedy under this warranty is limited solely to the repair or replacement, at the sole discretion of EPG, of the part that failed. The cost of labor for any field repairs is not covered by this warranty. EPG Companies will not be liable for any damage or wear due to abnormal conditions or improper installation.

Products not manufactured by EPG Companies Inc. are covered by the original manufacturer's warranty, which EPG Companies passes through to the purchaser. The actual manufacturer will make warranty determination.

To have a defective part repaired or replaced, you must return the defective product to EPG Companies. Please call (800) 443-7426 or (763) 424-2613 to obtain a RMA number. Send defective product (freight prepaid) with RMA #, description of installation, installation data and failure date to EPG Companies Inc., 19900 County Rd. 81, Maple Grove, MN 55311.

EPG Companies will not be held liable for any incidental or consequential damages, losses or expenses incurred from installation, use or any other reason. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF EITHER FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY, WHICH EXTEND BEYOND THOSE SPECIFICALLY LISTED HERE.

If equipment is to be stored for a period greater than six months, proper storage precautions must be taken if the warranty is to be maintained. Please call EPG Companies for specific requirements regarding product storage.

The following is a partial list of items, which will void the warranty:

- Opening the motor for any reason.
- Using undersized electrical wire.
- Making unauthorized circuit changes. Please call EPG Companies before making any changes.
- Operating a three phase submersible motor from single phase power through a phase converter unless 3-leg ambient-compensated quick trip overload protectors are used and complete details are sent in writing to EPG Companies.

* To qualify for the delayed installation warranty you must contact EPG Companies Inc., at (800) 443-7426 or (763) 424-2613 within 60 days of purchase.

Attachment 14 - Sensaphone 800 Operator's Manual

SENSAPHONE®

DESKTOP MONITORING SYSTEM

Model 800

User's Manual

Stay informed and in control of vital environmental conditions and processes with the fully-programmable ***Sensaphone® Model 800.***

LIT-0130

SENSAPHONE®

Model 800

User's Manual

Version 1.6

Every effort has been made to ensure that the information in this document is complete, accurate and up-to-date. SENSAPHONE assumes no responsibility for the results of errors beyond its control. SENSAPHONE also cannot guarantee that changes in equipment made by other manufacturers, and referred to in this manual, will not affect the applicability of the information in this manual.

First Edition, version 1.6, February, 2015

Written and produced by Sensaphone

Please address all comments on this publication to:

SENSAPHONE
901 Tryens Road
Aston, PA 19014
www.sensaphone.com

IMPORTANT SAFETY INSTRUCTIONS

Your Model 800 has been carefully designed to give you years of safe, reliable performance. As with all electrical equipment, however, there are a few basic precautions you should take to avoid hurting yourself or damaging the unit:

- Read the installation and operating instructions in this manual carefully. Be sure to save it for future reference.
- Read and follow all warning and instruction labels on the product itself.
- To protect the Model 800 from overheating, make sure all openings on the unit are not blocked. Do not place on or near a heat source, such as a radiator or heat register.
- Do not use your Model 800 near water, or spill liquid of any kind into it.
- Be certain that your power source matches the rating listed on the AC power transformer. If you're not sure of the type of power supply to your facility, consult your dealer or local power company.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
- Do not overload wall outlets and extension cords, as this can result in the risk of fire or electric shock.
- Never push objects of any kind into this product through ventilation holes as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock.
- To reduce the risk of electric shock, do not disassemble this product, but return it to Sensaphone Customer Service, or other approved repair facility, when any service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the unit is subsequently used.
- If anything happens that indicates that your Model 800 is not working properly or has been damaged, unplug it immediately and follow the procedures in Appendix F for having it serviced. Return the unit for servicing under the following conditions:

1. The power cord or plug is frayed or damaged.

2. Liquid has been spilled into the product or it has been exposed to water.

3. The unit has been dropped, or the cabinet is damaged.

4. The unit doesn't function normally when you're following the operating instructions.

- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.

CAUTION

To Reduce the Risk of Fire or Injury to Persons, Read and Follow these Instructions:

1. Use only the following type and size batteries: Alkaline, size C.
2. Do not dispose of the batteries in a fire. The cell may explode. Check with local codes for possible special disposal instructions.
3. Do not open or mutilate the batteries. Released electrolyte is corrosive and may cause damage to the eyes or skin. It may be toxic if swallowed.
4. Exercise care in handling batteries in order not to short the battery with conducting materials such as rings, bracelets, and keys. The battery or conductor may overheat and cause burns.
5. Do not mix old and new batteries in this product.

FCC Requirements

Part 68: The Sensaphone® Model 800 complies with Part 68 of the FCC rules. On the back of the unit there is a label that contains, among other information, the FCC Registration Number and the Ringer Equivalence Number (REN) for this equipment. You must, upon request, provide this information to your local telephone company.

The REN is useful to determine the quantity of devices that you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the RENs of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices that you may connect to your line, you may want to contact your local telephone company to determine the maximum REN for your calling area.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Should the Model 800 cause harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, the telephone company may temporarily discontinue service without notice and you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC. The telephone company may make changes in its facilities, equipment, operations, or procedures where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of the FCC that could affect the proper functioning of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this equipment, or you need information on obtaining service or repairs, please contact:

SENSAPHONE

901 Tryens Road, Aston, PA 19014

610-558-2700 Fax: 610-558-0222

The telephone company may ask that you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

Part 15: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Canadian Department of Communications Statement

Notice: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, where the company's inside wiring is associated with a single line, individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100. For the Sensaphone® Model 800, the Load Number is 0.3.

1 YEAR LIMITED WARRANTY

PLEASE READ THIS WARRANTY CAREFULLY BEFORE USING THE PRODUCT.

THIS LIMITED WARRANTY CONTAINS SENSAPHONE'S STANDARD TERMS AND CONDITIONS. WHERE PERMITTED BY THE APPLICABLE LAW, BY KEEPING YOUR SENSAPHONE PRODUCT BEYOND THIRTY (30) DAYS AFTER THE DATE OF DELIVERY, YOU FULLY ACCEPT THE TERMS AND CONDITIONS SET FORTH IN THIS LIMITED WARRANTY.

IN ADDITION, WHERE PERMITTED BY THE APPLICABLE LAW, YOUR INSTALLATION AND/OR USE OF THE PRODUCT CONSTITUTES FULL ACCEPTANCE OF THE TERMS AND CONDITIONS OF THIS LIMITED WARRANTY (HEREINAFTER REFERRED TO AS "LIMITED WARRANTY OR WARRANTY"). IF YOU DO NOT AGREE TO THE TERMS AND CONDITIONS THIS WARRANTY, INCLUDING ANY LIMITATIONS OF WARRANTY, INDEMNIFICATION TERMS OR LIMITATION OF LIABILITY, THEN YOU SHOULD NOT USE THE PRODUCT AND SHOULD RETURN IT TO THE SELLER FOR A REFUND OF THE PURCHASE PRICE. THE LAW MAY VARY BY JURISDICTION AS TO THE APPLICABILITY OF YOUR INSTALLATION OR USE ACTUALLY CONSTITUTING ACCEPTANCE OF THE TERMS AND CONDITIONS HEREIN AND AS TO THE APPLICABILITY OF ANY LIMITATION OF WARRANTY, INDEMNIFICATION TERMS OR LIMITATIONS OF LIABILITY.

1. **WARRANTOR**: In this Warranty, Warrantor shall mean "Dealer, Distributor, and/or Manufacturer."

2. **ELEMENTS OF WARRANTY**: This Product is warranted to be free from defects in materials and craftsmanship with only the limitations and exclusions set out below.

3. **WARRANTY AND REMEDY**: One-Year Warranty — In the event that the Product does not conform to this warranty at any time during the time of one year from original purchase, warrantor will repair the defect and return it to you at no charge.

This warranty shall terminate and be of no further effect at the time the product is: (1) damaged by extraneous cause such as fire, water, lightning, etc. or not maintained as reasonable and necessary; or (2) modified; or (3) improperly installed; or (4) misused; or (5) repaired or serviced by someone other than Warrantors' authorized personnel or someone expressly authorized by Warrantor's to make such service or repairs; (6) used in a manner or purpose for which the product was not intended; or (7) sold by original purchaser.

LIMITED WARRANTY, LIMITATION OF DAMAGES AND DISCLAIMER OF LIABILITY FOR DAMAGES: THE WARRANTOR'S OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIR OR REPLACEMENT OF THE PRODUCT, AT THE WARRANTOR'S OPTION AS TO REPAIR OR REPLACEMENT. IN NO EVENT SHALL WARRANTORS BE LIABLE OR RESPONSIBLE FOR PAYMENT OF ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL AND/OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING BUT NOT LIMITED TO ANY LABOR COSTS, PRODUCT COSTS, LOST REVENUE, BUSINESS INTERRUPTION LOSSES, LOST PROFITS, LOSS OF BUSINESS, LOSS OF DATA OR INFORMATION, OR FINANCIAL LOSS, FOR CLAIMS OF ANY NATURE, INCLUDING BUT NOT LIMITED

TO CLAIMS IN CONTRACT, BREACH OF WARRANTY OR TORT, AND WHETHER OR NOT CAUSED BY WARRANTORS' NEGLIGENCE. IN THE EVENT THAT IT IS DETERMINED IN ANY ADJUDICATION THAT THE LIMITED WARRANTIES OF REPAIR OR REPLACEMENT ARE INAPPLICABLE, THEN THE PURCHASER'S SOLE REMEDY SHALL BE PAYMENT TO THE PURCHASER OF THE ORIGINAL COST OF THE PRODUCT, AND IN NO EVENT SHALL WARRANTORS BE LIABLE OR RESPONSIBLE FOR PAYMENT OF ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL AND/OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING BUT NOT LIMITED TO ANY LOST REVENUE, BUSINESS INTERRUPTION LOSSES, LOST PROFITS, LOSS OF BUSINESS, LOSS OF DATA OR INFORMATION, OR FINANCIAL LOSS, FOR CLAIMS OF ANY NATURE, INCLUDING BUT NOT LIMITED TO CLAIMS IN CONTRACT, BREACH OF WARRANTY OR TORT, AND WHETHER OR NOT CAUSED BY WARRANTORS' NEGLIGENCE.

WITHOUT WAIVING ANY PROVISION IN THIS LIMITED WARRANTY, IF A CIRCUMSTANCE ARISES WHERE WARRANTORS ARE FOUND TO BE LIABLE FOR ANY LOSS OR DAMAGE ARISING OUT OF MISTAKES, NEGLIGENCE, OMISSIONS, INTERRUPTIONS, DELAYS, ERRORS OR DEFECTS IN WARRANTORS' PRODUCTS OR SERVICES, SUCH LIABILITY SHALL NOT EXCEED THE TOTAL AMOUNT PAID BY THE CUSTOMER FOR WARRANTORS' PRODUCT AND SERVICES OR $250.00, WHICHEVER IS GREATER. YOU HEREBY RELEASE WARRANTORS FROM ANY AND ALL OBLIGATIONS, LIABILITIES AND CLAIMS IN EXCESS OF THIS LIMITATION.

INDEMNIFICATION AND COVENANT NOT TO SUE: YOU WILL INDEMNIFY, DEFEND AND HOLD HARMLESS WARRANTORS, THEIR OWNERS, DIRECTORS, OFFICERS, EMPLOYEES, AGENTS, SUPPLIERS OR AFFILIATED COMPANIES, AGAINST ANY AND ALL CLAIMS, DEMANDS OR ACTIONS BASED UPON ANY LOSSES, LIABILITIES, DAMAGES OR COSTS, INCLUDING BUT NOT LIMITED TO DAMAGES THAT ARE DIRECT OR INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL, AND INCLUDING ATTORNEYS FEES AND LEGAL COSTS, THAT MAY RESULT FROM THE INSTALLATION, OPERATION, USE OF, OR INABILITY TO USE WARRANTORS' PRODUCTS AND SERVICES, OR FROM THE FAILURE OF THE WARRANTORS' SYSTEM TO REPORT A GIVEN EVENT OR CONDITION, WHETHER OR NOT CAUSED BY WARRANTORS' NEGLIGENCE.

YOU AGREE TO RELEASE, WAIVE, DISCHARGE AND COVENANT NOT TO SUE WARRANTORS, THEIR OWNERS, DIRECTORS, OFFICERS, EMPLOYEES, AGENTS, SUPPLIERS OR AFFILIATED COMPANIES, FOR ANY AND ALL LIABILITIES POTENTIALLY ARISING FROM ANY CLAIM, DEMAND OR ACTION BASED UPON ANY LOSSES, LIABILITIES, DAMAGES OR COSTS, INCLUDING BUT NOT LIMITED TO DAMAGES THAT ARE DIRECT OR INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL, AND INCLUDING ATTORNEYS FEES AND LEGAL COSTS, THAT MAY RESULT FROM THE INSTALLATION, OPERATION, USE OF, OR INABILITY TO USE WARRANTORS' PRODUCTS AND SERVICES, OR FROM THE FAILURE OF THE WARRANTORS' SYSTEM TO REPORT A GIVEN EVENT OR CONDITION, WHETHER OR NOT CAUSED BY WARRANTORS' NEGLIGENCE, EXCEPT AS NECESSARY TO ENFORCE THE EXPRESS TERMS OF THIS LIMITED WARRANTY.

EXCLUSIVE WARRANTY: THE LIMITED WARRANTY OR WARRANTIES DESCRIBED HEREIN CONSTITUTE THE SOLE WARRANTY OR WARRANTIES TO THE PURCHASER. ALL IMPLIED WARRANTIES ARE EXPRESSLY DISCLAIMED,

INCLUDING: THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR USE AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND THE WARRANTY OF NON-INFRINGEMENT AND/OR ANY WARRANTY ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

It must be clear that the Warrantors are not insuring your premises or business or guaranteeing that there will not be damage to your person or property or business if you use this Product. You should maintain insurance coverage sufficient to provide compensation for any loss, damage, or expense that may arise in connection with the use of products or services, even if caused by Warrantors' negligence. The warrantors assume no liability for installation of the Product and/or interruptions of the service due to strikes, riots, floods, fire, and/or any cause beyond Seller's control, further subject to the limitations expressed in any License Agreement or other Agreement provided by Warrantors to purchaser.

The agreement between the Warrantors and the Purchaser, including but not limited to the terms and conditions herein shall not be governed by the Convention for the International Sale of Goods. Where applicable, the Uniform Commercial Code as adopted by the State of Delaware shall apply.

4. **PROCEDURE FOR OBTAINING PERFORMANCE OF WARRANTY**: In the event that the Product does not conform to this warranty, the Product should be shipped or delivered freight prepaid to a Warrantor with evidence of original purchase.

5. **LEGAL REMEDIES AND DISCLAIMER**: Some jurisdictions may not allow, or may place limits upon, the exclusion and/or limitation of implied warranties, incidental damages and/or consequential damages for some types of goods or products sold to consumers and/or the use of indemnification terms. Thus, the exclusions, indemnification terms and limitations set out above may not apply, or may be limited in their application, to you. If the implied warranties can not be excluded, and the applicable law permits limiting the duration of implied warranties, then the implied warranties herein are to be limited to the same duration as the applicable written warranty or warranties herein. The warranty or warranties herein may give you specific legal rights that will depend upon the applicable law. You may also have other legal rights depending upon the law in your jurisdiction.

6. **CHOICE OF FORUM AND CHOICE OF LAW**: In the event that a dispute arises out of or in connection with this Limited Warranty, then any claims or suits of any kind concerning such disputes shall only and exclusively be brought in either the Court of Common Pleas of Delaware County, Pennsylvania or the United States District Court for the Eastern District of Pennsylvania.

Regardless of the place of contracting or performance, this Limited Warranty and all questions relating to its validity, interpretation, performance and enforcement shall be governed by and construed in accordance with the laws of the State of Delaware, without regard to the principles of conflicts of law.

Effective date 05/01/2004
SENSAPHONE
901 Tryens Road

Aston, PA 19014
Phone: 610.558.2700 Fax: 610.558.0222
www.sensaphone.com

TABLE OF CONTENTS

Chapter 1: Introduction

The Sensaphone® Model 800 is a fully-programmable, environmental monitoring system that offers extensive on-site and remote monitoring capability to small businesses, private homes, farms, greenhouses, computer rooms, and remote facilities. Designed for desktop or wall mounting, the Model 800 is simple to install, program and operate; no changes to standard electrical or telephone service are required. When connected to a telephone line, it will respond to an alarm by dialing up to four separate telephone numbers. When the call is answered, an "Alert Condition" message is delivered in user recordable voice.

The Model 800 features built-in sensors to monitor a variety of conditions:

- High sound level
- AC electric power failure
- Battery backup
- Temperature*

*Note: While technically not a "built-in" sensor, temperature is factory installed on zone 1.

The 800 is equipped with 8 alert zones. Additional sensors* can be added to extend monitoring capabilities to include:

- Intrusion or unauthorized entry
- Water leaks and seepage
- Temperature
- Humidity
- Equipment operation
- Many other conditions that may require unique monitoring solutions

* Refer to Appendix D for information on additional sensors (available separately from Sensaphone) best suited to your application.

The status of each monitored condition is readily obtained at the unit's installation site, or remotely by telephone. At the close of every Status Report, time is provided for listening to on-site sounds.

To ensure reliable operation, the Model 800 features power backup capability; in the event of AC power failure, six C-cell

alkaline batteries (not included) will continue to power the unit for approximately 24 hours.

Feature Summary

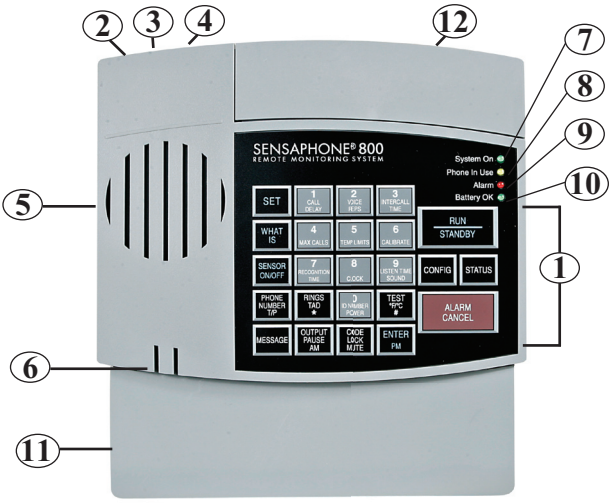
The Sensaphone 800 includes the following features:

- Eight zones configurable as temperature or dry contact
- Each zone can be individually enabled or disabled
- Fully automatic input configuration
- Temperature sensor included on zone #1
- Calibration for each zone
- Power monitor
- High sound-level monitor
- User-recordable voice messages
- Dial out to eight telephone numbers
- Alarm dial out via voice and numeric pager
- Microphone for onsite listen-in
- Built-in line seizure
- Relay output (manual or automatic control)
- Four status LEDs
- Surge protection on all zones, telephone line, and power supply
- 24 hour battery backup (batteries not included)
- Wall or desktop installation

About This Manual

This manual comprises the instructions and commands for installing and operating the Model 800. The Quick Start chapter is included to speed understanding of programming and operation. Communication and Alarm Programming chapters demonstrate step-by-step methods for utilizing the full range of available features. The Troubleshooting chapter provides assistance in the event that problems are encountered.

Layout



1. Programming Keypad
2. Power Jack
3. Phone Extension Jack
4. Phone Line Jack
5. Speaker
6. Built in Microphone
7. System on LED
8. Phone-in-use LED
9. Alarm LED
10. Battery OK LED
11. Battery Compartment
12. Input/Output Wiring Door

LED INDICATORS

The LEDs provide on-site alarm and status information. Listed below are descriptions of how the LEDs work.

System On

LED Off: Unit is off

LED On: Unit is in Run mode

LED Blinking: Unit is in Standby mode

Phone-In-Use

LED On: The unit or some other device is communicating on the phone line

LED Off: Phone line is not in use

LED Blinking: No telephone service detected

Alarm

LED Off: No alarms exist

LED Blinking: Unacknowledged alarm exists

LED On: Acknowledged alarm exists

Battery OK

LED On: Battery condition good

LED Blinking: Battery condition low

LED Off: No battery/critically low battery condition

Technical Support

If any questions arise upon installation or operation of the Model 800, please contact the Sensaphone Technical Service Department at the number shown below, and have the following information:

- Date of Purchase _____
- Serial number of your Model 800 _____

Technical Support is available from 8:00AM to 5:00PM EST.

You may also email us at support@sensaphone.com.

Sensaphone

901 Tryens Road

Aston, PA 19014

610-558-2700

Fax: 610-558-0222

www.sensaphone.com

Chapter 2: Installation

Correctly installing the Model 800 will ensure proper functioning of the unit. Please read the entire chapter before starting the installation process.

Within the packaging will be a Warranty Registration Card. Please take the time to fill this out and mail. The One Year Limited Warranty is explained in the front of this manual.

2.1 Operating Environment

The Model 800 should be installed and operated in a clean, dry area that provides space for wiring sensors to the screw terminals, near an AC power source and telephone line. Operating temperature ranges from 32° Fahrenheit (0° Celsius) to +122° Fahrenheit (+50° Celsius).

NOTE

The Model 800 is a sensitive electronic device. **Do not** install the Model 800 near strong electrostatic, electromagnetic or radioactive fields. **Do not** expose to humid environments, fumes, or corrosive vapors.

2.2 Mounting

Flat Mount: Place the Model 800 on top of a desk or other horizontal surface. Wall Mount: Mount on a wall with two flathead screws using the keyholes on the back panel of the unit. Place the flathead screws or bolts 4” apart at the desired height from the floor. Hook the unit over the screws and toward the floor. Refer to Figure 2-1.

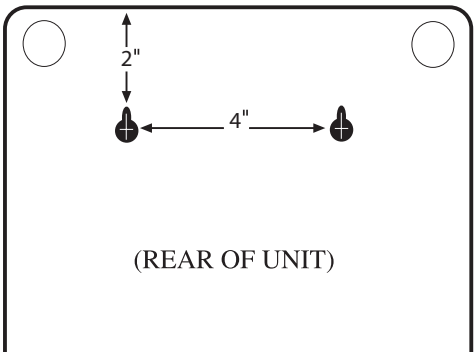


Figure 2-1. Wall Mount

2.3 Power Surge Protection

The Model 800 can be damaged by power surges and lightning through the telephone line and the 120 VAC power supply. Although the Model 800 has built-in surge protection, we recommend that additional protection be obtained for the unit and for any electronic equipment that is attached to your power supply and telephone lines. Power surge protection is especially important if you live in a lightning-prone area. The ISOTEL Surge Protector Model IB-4 is available through Sensaphone. See Appendix D.

2.4 Power Supply and Battery Backup

The Model 800 is provided with a DC power transformer that will plug into any standard 120 VAC outlet and a battery backup (batteries not included) that enables the unit to continue functioning if AC power is removed (due to electric power disruption or failure). The Model 800 uses six, C-cell alkaline batteries. Do not use rechargeable batteries. Connect the DC power transformer into the jack on the back of the unit and plug the adapator into a 120VAC outlet

NOTE

Be sure that the DC transformer is plugged into an outlet before installing batteries.

To install the batteries, remove the battery compartment door located on the front of the unit below the keypad. Press down and slide the door away from the unit, align batteries according to the diagram shown in Figure 2-2, and replace the hatch.

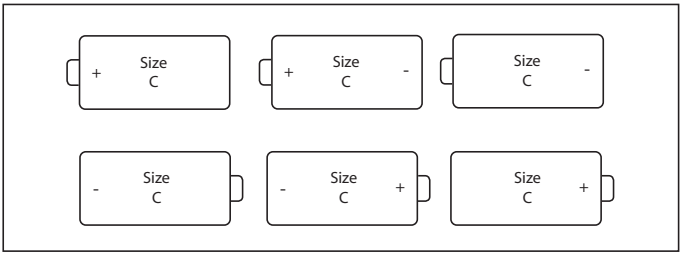


Figure 2-2. Battery Installation

2.5 Starting the Model 800

When the DC power transformer is first plugged into the electrical outlet, the Model 800 automatically starts in RUN mode. The *System On* light will begin to glow. The unit will respond with,"Hello, this is Sensaphone 800."

2.6 Run Mode and Standby Mode

Pressing the RUN/STANDBY key on the Model 800 keypad will alternately activate or deactivate the unit. If the unit is activated and in RUN mode, the system on light glows steadily. In STANDBY mode, the system on light goes out, but will blink every few seconds to indicate that power is still supplied to the unit.

In RUN mode, the Model 800 is able to receive incoming calls and to dial out automatically in the event of an alarm on one of the monitored conditions. To enter STANDBY mode, press RUN/STANDBY.

As soon as the Model 800 enters STANDBY mode, it responds with "Goodbye." The system on light immediately goes out and then resumes with a blink every few seconds. While in STANDBY mode, all functions are disabled, but programmed memory is preserved. Upon exiting STANDBY mode, any currently existing alarms will be announced.

NOTE

STANDBY mode is not equivalent to "power off"—an electrical source, such as the 120 VAC, or the battery backup, continues to provide full power to the unit. If the unit is placed in STANDBY mode, unplugged from the 120 VAC outlet, and placed in storage, the batteries will continue to power the Model 800, discharging until they fail. Consequently, batteries should always be removed from the unit following disconnection from any 120 VAC outlet, prior to storage.

Press the RUN/STANDBY key again to return to RUN mode.

Figure 2-3. The RUN/STANDBY Key